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EVALUATING REGULATIONS IMPOSED ON WILD BROOK TROUT LAKES TO RESTORE AGE AND SIZE QUALITY

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SUMMARY

Sixteen Maine lakes with wild brook trout populations were studied from 1994 to 1998 to gather biological information for statewide averages and to evaluate the effectiveness of new, restrictive regulations imposed on 334 of Maine's 1,103 brook trout lakes in 1996. Over the five year period, 11 creel surveys were conducted and 39 population estimates were made by fishery biologists in the Rangeley, Moosehead, Penobscot, and Fish River Lakes Regions. These studies revealed that anglers fish wild brook trout ponds at an average rate of 6 angler trips/acre of water (meaning that a 20-acre pond would be fished at an average rate of 120 angler days/year);

they harvest an average of 1.8 brook trout weighing 0.8 lb/acre annually (or 36 trout weighing a total of 16 lb from a 20-acre pond), which represents 17% of the total number of legal-size trout available.

The new regulations had little effect on the total number of brook trout, but rather on their size and age structure. The average size of the trout caught increased from 11.3 to 12.7 inches (a 12.4% increase) after restrictive regulations were imposed. For waters with low-to-moderate regulations, the proportion of trout age III+ and older was 20.3%, but for those with high-to-severe regulations, the proportion increased to 25.5%, indicating that the regulations are meeting their goal of protecting a portion of the older, genetically important brook trout from harvest. The increase in the number of legal-size brook trout resulted in better fishing, as the brook trout catch rate doubled from 0.6 to 1.1 trout per angler and the average time to catch a legal-size trout declined from 7 to 3 hours after the new regulations went into effect. It is recommended that this study be continued on a periodic basis to determine whether additional changes in brook trout population structures accrue with time.

ABSTRACT

Sixteen Maine lakes with wild brook trout *(Salvelinus fontinalis)* populations, located in Franklin, Piscataquis, and Somerset counties, were studied in 1994 to 1998 to: 1) evaluate the effectiveness of regulatory restrictions imposed to improve size quality and increase the proportion of older-age fish in the lake populations, and 2) gather biological information on a representative statewide sample of lentic wild brook trout populations. Regulatory effectiveness was determined by quantifying and comparing angler effort, brook trout catch and harvest rates; and post-season estimates of standing stock, biomass, and age structures. Brook trout abundance, standing stock, growth rates, population age structures, and interspecific competition were determined by post-season trapnetting. Population estimates were conducted at the 16 study waters from one to five years each for a total of 39 estimates. Catch and harvest rates were determined by season-long creel surveys on selected waters. Creel surveys were conducted at five waters from one to four years each, for a total of 11 estimates, 6 of which yielded total estimates of angler use and harvest. Annual rates of use varied from 2.0 to 27.5 angler trips/a (0.8 to 11.1/ha) and averaged 5.8/a (2.3/ha). Harvest ranged from 0.8 to 13.3 brook trout/a (0.3 to 5.4/ha) and averaged

1.8/a (0.7/ha). The weight of brook trout harvested averaged 0.8 lb/a (0.9 Kg/ha). Older-age (age III+ and greater) brook trout accounted for 95% of those kept by anglers. On average, anglers harvested 17% of the legal-size brook trout population. However, they harvested a disproportionate 32% of the older, mature fish. Average post-season brook trout abundance was 13±4/a (5±2/ha) and biomass averaged 4±2 lb/a (4±2 Kg/ha). These fish averaged 9.2±0.1 in. (233±1 mm) in length and 5.6±0.1 oz (159±3 g) in weight. Older-age (age III+ and greater) brook trout accounted for 23% of those sampled by trapnetting. All of the fish age V+ and older were sexually mature; 97% of the age IV+, 89% of the age III+, 66% of the age II+, and 41% of the age I+ fish were mature. Brook trout abundance was highest in waters with low interspecific competition, where they accounted for 99% of the biomass or 9.6 lb/a (3.9 Kg/ha). Brook trout biomass declined rapidly as the number of competing species increased, accounting for only 8% of the biomass in waters with a high level of competition (1.2 lb/a or 0.5 Kg/ha). Waters with the greatest number of competing species had the smallest-size brook trout. Lakes with the largest number of competing species had the largest proportions of older-age brook trout, however. From 1994-95 to 1996-98, regulatory severity at the study waters where population estimates were made increased from an average of Low to Moderate. The number of legal-size brook trout caught per angler doubled from 0.55 for 1994-95 (pre-regulation change) to 1.11 for 1996-98 (post-regulation change). The hours to catch a legal-size brook trout declined from 6.9 to 2.9 and the mean length of brook trout sampled increased from 11.3 inches (287 mm) to 12.7 inches (323 mm) for the same two periods. When the proportion of older-age trout were grouped by regulatory severity, trout age III+ and older accounted for 20.3% of those sampled in waters with low-to-moderate severity and 25.5% of those with high-to-severe regulatory severity. For brook trout of ages IV+ and older, the respective percentages were 3.5 and 4.2. The proportion of mature fish sampled also showed a positive correlation with regulatory severity, increasing from 58% for lakes with low regulatory severity to 63% for those with severe regulations. These data indicate that restrictive regulations have been effective in reducing the harvest of older-age brook trout, thereby improving the quality of the fisheries and contributing to their long-term survival through protection of spawning-size fish. It is recommended that these evaluations be continued periodically to monitor future changes in the statewide brook trout fishery.

KEY WORDS: AGE & GROWTH, AGE FREQUENCY, ANGLER EFFORT, ANGLER SURVEY, BIOMASS, BKT, HARVEST, INTERSPECIFIC COMPETITION, K-FACTOR, LAKE, MEAN SIZE, MIN, POPULATION ESTIMATE, SPECIES COMPOSITION, WATER QUALITY

INTRODUCTION

Effective in 1996, new regulations were imposed on 474 of Maine's brook trout lakes. The purpose of these regulations was to restore brook trout age and size quality in overexploited populations and to standardize special regulations, the proliferation of which had resulted in a complicated and cumbersome fishing lawbook.

Of Maine's 1,103 lakes with principal fisheries[1] for brook trout, 627 (57%) were supported by natural reproduction and 424 (38%) had never been stocked and therefore contained presumably pure wild strains. Increased exploitation of this resource over the last several decades had been documented by statewide angler questionnaires, with summer angler trips for brook trout increasing from 492,508 in 1978 (MDIF&W) to 1,353,092 in 1983 (MDIF&W 1985), and to 1,635,364 in 1994. Concurrent with these increases in effort, the brook trout catch rate declined 41% (from 2.2 to 1.3 fish per angler day) from 1983 to 1994 (MacDonald *et. al.* 1996).

Over-fishing not only reduces population size but, through the selective removal of larger individuals, is equivalent to selection for smaller sized fish (Wohlfarth 1984). Nuhfer and Alexander (1991) suggested that the intensity of angler exploitation may have altered the genetic potential for growth and catchability of wild brook trout strains in Michigan. Modification of phenotypic variation by exploitation imposes the risk of a reduction of genotypic diversity, thereby possibly resulting in a lower level of fitness (Kapuscinski and Lannan 1986).

To reduce exploitation, fishery managers have recommended a large number of special regulations over the last several decades. Special 1-and 2-fish limits replaced the general-law creel limit of five fish on more than 200 lakes. High length limits of 10 and 12 in were imposed on several hundred lakes and special gear restrictions were imposed on over 200 lakes. Despite these special

[1] A principal fishery is one for which the species is regularly sought by anglers and which makes up a significant portion of the catch.

regulations, the proportion of older, genetically important brook trout in the population had declined from historical levels; from 50 to 40% for age III and older, and from 19 to 9% for age IV and older (MDIF&W 1994).

Table 1. Regulatory categories imposed on Maine lakes, 1996.

Growth potential	Creel limit	Length limit (in)	Number of lakes: General law	Special regulation	All
Highest	2	12; only 1 fish may be greater than 14	0	127	127
High	2	10; only 1 fish may be greater than 12	0	217	217
Moderate	2	8	225	130	355
Low	5	6	776	0	776
All			1,001	474	1,475

Because the special regulations imposed to date had not been successful in protecting older, larger trout, we developed new regulatory categories intended to be more effective in
meeting this and several other goals. To simplify the fishing lawbook, we established a small number of standardized special regulations that could be applied to many lakes. We also needed to account for the variability in growth rates from lake to lake and to protect wild fish to spawning size and a portion of the older, larger spawners. To that end, we established and promulgated four regulatory categories, applicable to both wild and stocked populations (Table 1).

Before-and-after regulatory change comparisons were made at Brown, Salmon, and Secret ponds. Of the remaining waters sampled prior to 1996, Beaver Pond did not have regulatory changes imposed, and Little Moxie Pond's fish population was manipulated by removal of competing species. Nonetheless, these data are included because comparisons can be made among the age structures of

lakes with differing regulations. For the remaining study lakes, the effects of the regulations can be measured by changes over time in the proportion of older fish in the population. Because it took several years to determine whether changes occurred, monitoring during the first year of regulatory changes served as a baseline for following years. This method eliminated the bias of making comparisons between ponds.

Estimates of angler use and brook trout standing crops and harvest rates are available for only a few wild brook trout lakes. Historical data consist of the results of the Johnston Pond - Jo-Mary study conducted in the 1960's; this study documented angler use, harvest, and population estimates for these wild brook trout lakes (MDIF&W 1961-77). A similar but independent study was conducted at Desolation Pond in 1984 (Wefring and Eubanks 1985) (Appendix 1). Because the brook trout sampled from these waters were not aged, population structure could not be determined. Furthermore, these results are not current, and it cannot be assumed that they represent present statewide averages; for these reasons, they are treated as historical data and are used only for comparison to current results.

The objectives of this study are to: 1) evaluate the effectiveness of regulatory restrictions imposed to restore age and size quality to lentic wild brook trout populations, and 2) increase knowledge of the biology of wild brook trout populations in Maine lakes by documenting angler use, brook trout catch and harvest rates, population structure, effects of interspecific competition, and post-season standing stocks.

STUDY AREA

Because smaller lakes and ponds, by virtue of their higher proportion of littoral area, are considered to provide more productive trout habitat than do larger lakes, an arbitrary-but-realistic size of 200 acres was chosen to typify Maine trout lakes (MDIF&W 1986). Accordingly, 14 of the 16 lakes selected for this study were less than 200 acres in size (Table 2). Lakes were selected from a wide geographical area in an effort to attain a representative statewide sample. Eight of the lakes lie within the Penobscot River drainage,

three within the Androscoggin River drainage, three within the St. John River drainage, and two within the Kennebec River drainage. The lakes are located in wooded areas but are accessible by gravel roads. None has been stocked by the Department of Inland Fisheries and Wildlife. The study waters were chosen to obtain a wide variety of regulatory restrictions. The 16 study lakes, like the majority of Maine's wild trout lakes, are located in the state's interior highlands. With the exception of Clear Lake, which is oligotrophic, the study lakes are mesotrophic or eutrophic with thermal refugia. All lakes have water quality that is suitable for brook trout and that approximates the statewide average for wild brook trout lakes except that alkalinity[2] levels are below the statewide average (Appendix 2). Despite the low alkalinity, pH levels (which indicate the degree of acidity of the water) approximate statewide averages. Water transparency of most of the study lakes is somewhat less than that of the statewide average.

The lakes chosen for this study differ in the degree of interspecific competition. All of the lakes contain at least one fish species in addition to brook trout (Table 3). Five have populations of white suckers *(Catostomus commersoni)*; seven have golden shiners *(Notemigonus* crysoleucas) and five have rainbow smelts *(Osmerus mordax)* , all of which are considered to be competitors of brook trout. All of the study lakes contain one or more species of minnows *(Cyprinidae),* of which lake chub *(Cluesius plumbeus*) was the most widespread.

METHODS

Field work was initiated prior to the regulatory changes at Beaver and Little Moxie Ponds in 1994 and at Brown, Salmon, and Secret Ponds in 1995 (MDIF&W 1996). A comparison of the effect of restricted public access indicated that there was no difference in age structure between wild brook trout populations from Beaver Pond, which does not have public access, and brook trout lakes identified as having public access. Because availability of public access was not an accurate predictor of harvest, this analysis category has also been deleted.

[2]Alkalinity is a measure of the capacity of the substances dissolved in the water to neutralize acid.

Presumably because of its trophic status, species composition, and regulatory restrictions[3], Clear Lake supports brook trout at lower densities than the other waters surveyed. Because Clear Lake data were considered to be atypical of trout ponds as defined above, they are included separately and were omitted from statewide summaries.

Magnan (1988) demonstrated that brook trout yield in Canadian lakes was reduced 45% by the presence of white sucker and 32% by the presence of creek chub. In an effort to document the effect of competition on brook trout abundance and growth rates, a consensus value system was developed (Appendix 3) by subjectively rating competing species on a scale of 0 (non-competing) to 10 (most severe competition). The values were averaged from questionnaire responses completed by Maine fishery biologists. Resulting values for the competing species were then added and again prorated on a scale of 0 to 10 to obtain a total competition score (Table 3). This method allowed the grouping of waters into incremental categories of increasingly severe competition.

A value system of regulatory severity, similar in method to that devised for competing species, was also coded from 0 to 10 (Appendix 4); these codes, in turn, were grouped into adjective descriptors of low (0-2.25), moderate (2.5-4.75), high (5-7.25), and severe (7.5-10). The current (effective 1996) regulation severity indices on the 16 study waters vary from 0 (general law) to 10 (catch and release), and the changes in the severity indices from the previous to the current regulations varied from 0 to 5.5 (Table 4).

To determine the effectiveness of the new regulations and to gather biological information on wild brook trout populations, several parameters were measured (Table 5). Although estimates of angler use and harvest yield important biological information, season-long creel surveys were conducted infrequently due to expense. A stratified random clerk survey was conducted throughout the open water season at Crosby Pond in 1997, and similar information was provided by an angling club (Beaver Pond, 1994). At Little Moxie Pond, angler interviews conducted at the time that counts were made were supplemented with voluntary card surveys. For other waters we attempted to rely exclusively on anglers who voluntarily recorded their angler trips for brook trout catch and harvest rates but data were of poor quality and the effort was abandoned.

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[3] Clear Lake, unlike the other study ponds, is open to ice fishing.

Post-season population estimates, initiated on the average date of September 30, were determined by trapnetting (Table 6), using the multiple mark and recapture method. With few exceptions, only those brook trout age I+ and older were vulnerable to capture by trapnetting. An average of 2.3 nets were set per water and fished an average of 45 net-days (21 calendar days). During that period, the average water temperature declined from 55 to 44 degrees F. Relative abundance of competing species was assessed by counting the number of fish caught and weighing a subsample as an estimate of biomass. Brook trout ages were determined by standard scale-reading techniques. At Little Moxie, Salmon, and Secret ponds, the abundance and removal-rate of competing fish species were also documented. The interspecific competition category of Moxie Pond was changed twice during the period in acknowledgment of the status change resulting from removal of competing species. Comparisons of brook trout abundance and size were also made by pre- (1994-95) and post- (1996-98) regulation change periods.

Age frequencies of brook trout from the study lakes were compared to determine whether population age structures were affected by interspecific competition or by angler harvest. The proportion of older-age trout in the samples was considered to be an indicator of population status. These fish, which are vulnerable to over-exploitation by anglers because of their attractive size and relatively small numbers, are an important genetic reserve. For this reason, the relative abundance of older-age trout was used to determine regulatory effectiveness. Age III+ was the youngest year class for which most (89%) were mature. Because of the relatively small number of older-age trout sampled, the grouping of trout aged III+ and older also had the advantage of yielding sample sizes adequate for statistical comparison. Sexual maturity, a more accurate indicator of reproductive potential, could not be determined for angler-caught fish, but was determined from dimorphic sexual characteristics of fall-trapnetted brook trout (Table 14).

Differences between mean fish sizes were tested using ANOVA and Duncans multiple range test. Chi-square analysis was used to compare age structures, and Pearson's test was used to determine correlations. Significance level was set at P=0.05 for all tests.

RESULTS

This report includes the results of work conducted on the study ponds in 1998 and summarizes work conducted from 1994-97 and reported in Progress Report No. 4, except as noted above.

Angler catch rates and brook trout harvest

Lakes clerk-surveyed in 1994-95 had low to moderate regulatory severity; those surveyed from 1996-98 had high regulatory severity. The number of legal-size brook trout caught per angler doubled from the first to the second period, from an average of 0.55 to 1.11, but the number of legal-size brook trout kept per angler declined from an average of 0.50 to 0.43 (Table 7). There was an increase from 9% to 61% in the percent of legal-size brook trout released by anglers while the percent of sublegal-size trout caught remained similar at 35 vs. 36. The hours to catch a legal-size brook trout declined from an average of 6.9 to 2.9 and the mean length of brook trout sampled increased from 11.3 to 12.7 inches.

The number of brook trout harvested per acre at the clerk-surveyed study lakes from 1994-98 ranged from 0.8 to 2.1 and averaged 1.4, compared to an average of 29.4 for the historical data. The weight of the brook trout harvested from the those lakes varied from 0.5 to 1.2 and averaged 0.8 lb/a, again substantially less than the historical average of 9.7 lb/a. Fourteen percent of the anglers were successful in catching a legal-size brook trout, and the catch rate averaged 0.9 legal-size brook trout per angler trip.

Because few aged fish were sampled during the creel surveys at any of the study lakes, no effort was made to compare the samples statistically. Despite the differences in minimum length limits among the study lakes, 95% of the brook trout sampled were older-age (III+ and greater) fish (Table 8), indicating that larger, older fish are preferred by those anglers who voluntarily release a portion of their legal-size catch and that these fish are therefore vulnerable to over-harvest.

At Beaver Pond, where the minimum length limit is 6 in, anglers recorded the approximate lengths of 454 unaged angled brook trout in 1994-96 (Table 9). Those kept averaged 11.6 inches in length, compared to 7.8 in for those released. Anglers voluntarily released 89% of the brook trout 6 in and longer and 66% of the brook trout 10 in and longer, compared to a release rate of only 29% of the brook trout 10 in (the minimum length limit) and longer at Little Moxie Pond.

Only 4% of the estimated standing stock was harvested at Beaver Pond despite low regulatory protection (Table 10); at Little Moxie and Secret Ponds, which had moderate regulatory protection through 1995, an average of 24% of the estimated standing stock was harvested annually. After the regulation change at Little Moxie Pond (from Moderate to High), the harvest declined only slightly from 18% to 16%. At Crosby Pond, which has high regulatory protection, 17% of the standing stock was harvested. For all waters, a disproportionately high number of older fish were harvested. Overall, an average of 35% of the older (age III+ and greater) fish were harvested, compared to a 17% harvest-rate overall. The highest proportion of older fish was harvested at Little Moxie Pond, where an average of 61% of the brook trout age III+ and older were removed in 1994 and 1995; the percentage declined to 22 in 1998 after the imposition of more restrictive regulations. There was no relationship between angler use and the proportion of older fish harvested.

Of the 357 brook trout angled from Beaver Pond that were between 6 and 10 in long, only 5 (1.4%) were kept (Table 11). Because of the voluntary release of virtually all smaller fish, Beaver Pond has an effective length limit of 10 inches, and is presumed to be atypical of lakes with this length regulation. Beaver Pond data were therefore combined with those of the other lakes that have legal length limits of 10 in to determine the proportion of different inch-classes that were kept. Anglers kept only 0.9% of all brook trout from 6-10 in long, but 55% of those from 10-12 in and 80% of those greater than 12 in long**.** On a per-unit-of-area basis, the mean harvest rate of brook trout for the study lakes was 1.8 (0.8 lb)/a (Table 7).

Angler use

Six estimates of angler use varied from 2.0 to 27.5 and averaged 5.8 anglers/a/season (Table 7). The voluntary surveys (Beaver and Secret ponds) yielded the most extreme rates of use, and averaged 14.9 anglers/a/season. The estimate derived from a clerk survey (Crosby Pond) and from voluntary surveys with clerk angler counts (Little Moxie Pond) were lower and more consistent, ranging from 2.0 to 11.2 and averaging 4.9 anglers/a/season. The historical average rate of angler-use for the three waters evaluated prior to this study was 12.4 anglers/a/season.

Brook trout population estimates, biomass, and mean sizes

The mean 1994-98 post-fishing season population estimate of age I+ and older brook trout/a for all study waters (exclusive of Clear Lake) was 13.3 and ranged from 0.9 to 47.5 (Table 12). The brook trout biomass averaged 4.0 and ranged from 0.3 to 24.3 lb/a. When brook trout abundance and biomass were calculated using littoral acres rather than total acres, their numbers increased by 11.8% and their weight increased by 9.6%. There was no difference in the number/a or weight/a of brook trout for the year-groups 1994-95 and 1996-98. For Clear Lake, which is oligotrophic, brook trout averaged 0.3 (0.2 lb)/a; for littoral acres, their abundance increased 194% and their weight increased 218%.

The average size of the 3,288 brook trout aged by scale reading since the inception of the study in 1994 was 9.2 inches and 5.6 ounces (Table 13). For all fish, the greatest incremental increase in length occurred between their second and third year, when they increased an average of 2.9 inches; the greatest weight increment occurred between their third and fourth year, when they increased an average of 8.3 ounces. Brook trout age III+ and older represented 23% and age IV+ and older represented 3.6% of those sampled (Table 14).

Regulatory severity and brook trout age and maturity frequencies

The study waters were grouped by year group and regulation severity (Table 15), to determine whether differences in the proportion of mature or older-age fish could be attributed to the regulations in effect. For the two year-groups 1994-95 and 1996-98 the average regulatory severity for the study waters increased from 3.9 (moderate) to 5.4 (high). For these two year groups the percentages of fish age III+ and older increased from 22% to 23% and those age IV+ and older increased from 1% to 4%; the increase in the percentage of brook trout age IV+ and older was statistically significant. When year-groups were disregarded and the proportion of older-age fish are grouped by regulatory severity, trout age III+ and older accounted for 20.3% of those sampled in waters with low to moderate severity and 25.5% of those with high to severe regulatory severity. For brook trout of ages IV+ and older, the respective percentages were 3.5 and 4.2.

The proportion of mature fish sampled averaged 56% for all waters. There was a significant correlation between the regulation severity and the proportion of older fish; the percentage of mature fish increased from 58% for lakes with low regulatory severity to 63% for those with severe regulations.

Role of competing fish species

In ponds with a low rate of competition, brook trout accounted for 90 % of the biomass trapnetted (Table 16); for those with moderate rates of competition, they accounted for 17%; and for those with high competition, they made up only 8% of the biomass trapnetted. For all lakes, brook trout accounted for an average of only 16% of the biomass trapnetted. Clear Lake had a relatively high proportion of brook trout biomass, averaging 23% of all the fish sampled.

Estimates of brook trout biomass ranged from 9.6 lb/a for lakes with low interspecific competition to 1.2 lb/a for those with high interspecific competition (Table 17). The value for Clear Lake was 0.4 lb/a. The proportion of older-age brook trout was highest (26%) in waters with high levels of interspecific competition; the value for those with moderate competition was 11%, and that for lakes with low competition was 23%. For Clear Lake, which had the highest rate of interspecific competition, 53% of the brook trout were older-age fish.

Mean sizes of brook trout sampled from the study ponds during fall trapnetting were compared by the degree of interspecific competition (Table 18). Both lengths and weights of ages I+, II+, and III+ brook trout from waters with high competition were significantly smaller than those from the other categories.

There were significant inverse relationships between the degree of interspecific competition and brook trout abundance[4] and biomass[5] (correlation coefficient = -0.66; P = 0.0003). There was a significant relationship between competition and the percent of

[4] No of brook trout per acre.

[5] Lb of brook trout per acre.

older brook trout in the population. Older brook trout in lakes with low to moderate competition comprised an average of 17% of the population; for lakes with high to severe competition, they comprised an average of 33% of the population (Table 19).
There were also significant relationships between regulation severity and brook trout biomass (correlation coefficient = 0.48; P = 0.016) and the percent of older brook trout (correlation coefficient = -0.58; P = 0.003) than those containing additional competing species.The removal of competing fish species from Little Moxie Pond resulted in a dramatic increase in brook trout numbers and biomass from 1994 to 1998 (Table 20). The estimated number of brook trout per acre increased from 5.3 (1.2 lb) per acre in 1994 to 19.4 (7.3 lb) in 1998 a 266% increase in numbers and a 508% increase in weight. The quantity of suckers and minnows removed from Little Moxie during post-season nettings accounted for an average of 97% of the lake's biomass in 1994 but only 2% in 1998. The resultant change in the brook trout population structure is consistent with other waters in that the proportion of older-age fish has declined and brook trout growth rates have increased as interspecific competition has declined.

DISCUSSION

The average regulation severity for the study ponds increased from low during the first year-group (1994-95) to moderate during the second year-group (1996-98). Comparison of creel survey data from the two periods indicates an improving brook trout fishery, as demonstrated by a doubling in the number of legal-size fish caught per angler and a decrease in the hours to catch a legal-size fish. At Moxie Pond, which has been creel surveyed both prior to and after the regulation changes, the proportion of older fish harvested declined from 61% to 22% after the regulation change. Because anglers tend to selectively harvest the older, larger individuals, the new regulations have apparently been successful in restricting the harvest of this portion of the population. The average angler use rate of 6 angler trips/a/season at the study lakes is substantially less than that of stocked lakes, which range from 14 angler trips/a/season at Quimby Pond (MDIF&W 1983) to 31 at three Central Maine lakes (MDIF&W 1999). These rates suggest that the wild trout study lakes were fished less intensively than stocked lakes. The lowest historical rate of angler use (1.6 angler trips/a/season) was recorded

at Desolation Pond, which is both remote and access-restricted. At Johnston and Jo-Mary Ponds, both surveyed in the 1960's, the average numbers of angler trips per acre per season were 11.9 and 16.7 respectively. The 1995 Secret Pond estimate of 27.5 angler trips/a/season is therefore the highest recorded to date. Overall, rates of angler use varied widely.

Historical data indicate a decline in the proportion of older-age brook trout sampled from statewide lakes over time, from 19% age IV+ and older in 1939-44 to 9% as recently as 1989-93 (MDIF&W 1995). The data from the study lakes indicated a further decline to 1% in 1994-95, but an increase to 4% in 1996-98 after the imposition of more restrictive regulations. The proportion of age III+ and older fish also increased slightly from 22 to 23% for the same two year-groups. Grouping the data by regulatory severity (low-to-moderate and high-to-severe) rather than year groups indicated a greater increase in age III+ and older trout from 20% to 26% and in age IV+ and older trout from 3.5% to 4.2%. There was also an increase in the proportion of mature fish (independent of age) as regulatory severity increased. These data indicate that the more restrictive regulations imposed in 1996 were effective in preventing further decline in the numbers of older brook trout, but that the abundance of older-age fish in wild brook trout populations is still substantially less than that of historical levels.

Comparison of size and age frequencies among the study waters indicated that age I+ brook trout were significantly larger in waters with low interspecific competition, and that their mean sizes decreased as competition increased. By age II+, however, there were significant differences among the classes, but no trends. For age III+, there were fewer significant differences among the classes, indicating that growth rates had stabilized. These results suggest that there is not a simple inverse relationship between brook trout growth rates and the presence of competing species. The positive relationship between interspecific competition and the proportion of older individuals in brook trout populations suggests that future analysis should continue to consider this variable as a factor in determining the effects of regulatory protection.

At Jo-Mary and Little Moxie ponds, 89% of fish biomass consisted of competing fish species, demonstrating the ability of these species to dominate the habitat. Of the study lakes, brook trout numbers and biomass were highest in those lakes with low interspecific competition and lowest in lakes with high competition. Complete removal of competing species by trap netting is

unlikely, and their numbers will undoubtedly rebound once removal efforts are terminated. Nonetheless, removal efforts have resulted in a substantially improved wild brook trout fishery, and will present an opportunity to determine the duration of the improvements once removal efforts are terminated.

Clear Lake, which had high brook trout growth rates and a high proportion of older-age trout despite having the greatest number of competing species, was inconsistent with the trends at the other lakes. These differences were attributed to the fact that Clear Lake's oligotrophic habitat is substantially different from that of the other study waters. Clear Lake data were included as a separate category to document those differences and to suggest that additional work needs to done to evaluate brook trout fisheries in oligotrophic lakes.

The results of this study to date, particularly with reference to the new regulations, are encouraging. Due to time constraints, the annual statewide effort to monitor wild brook trout populations was terminated at the end of the 1998 season. However, limited evaluation of several study lakes will continue to determine the effect of the new classes of regulatory restrictions, the removal of competing species, and to build a database representative of statewide brook trout lakes. Furthermore, it is recommended that the study lakes be re-sampled by conducting fall population estimates every third year to determine whether there are additional changes in the population structure.

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Table 2. Physical characteristics of the wild brook trout lakes surveyed in 1996-98 and of 475 wild brook trout lakes <=200 acres sampled statewide.

Water	County	River drainage: Major	River drainage: Minor	Surface area (acres)	Depth Mean (ft)	Depth Max. (ft)	Littoral[6] acres (percent)	Elevation (ft)	Maximum secchi reading (ft)
B Pond	Piscataquis	Penobscot	Pleasant	644	14	34	447 (69)	1040	12.3
Beaver P	Franklin	Androscoggin	Kennebago	20	8	20	20 (100)	1991	7.9
Brown P	Piscataquis	Penobscot	Sebec	18	4	8	18 (100)	1432	6.5
Clear L	Piscataquis	St. John	Musquacook	614	29	86	233 (38)	1196	23.0
Coffeelos P	Piscataquis	Penobscot	E. Br. Penobscot	198	7	24	190 (96)	1047	12.0
Crosby P	Franklin	Kennebec	North Branch Dead	150	13	26	110 (73)	1395	8.0
Daicey P	Piscataquis	Penobscot	Middle W. Br. Penobscot	38	10	26	35 (93)	1087	13.0
Johnston P	Piscataquis	Penobscot	Lower W. Br. Penobscot	59	19	60	34 (59)	1364	23.0
Kamankeag P	Franklin	Androscoggin	Kennebago	40	15	28	29 (73)	1957	18.0
Moxie P (Little)	Somerset	Penobscot	Upper Piscataquis	73	5	9	73 (100)	1302	7.9
Pillsbury P (Little)	Piscataquis	St. John	Upper Allagash	45	5	8	45 (100)	1069	7.0
Rock P	Franklin	Androscoggin	Kennebago	26	4	6	26 (100)	2167	6.0
Salmon P	Piscataquis	Penobscot	Sebec	12	7	15	12 (100)	1210	6.0
Secret P	Piscataquis	Penobscot	Sebec	14	10	34	10 (68)	1270	10.0
Thissell P	Piscataquis	St. John	Upper Allagash	141	21	42	65 (46)	1412	.
Turner P (Big)	Somerset	Kennebec	Moose	111	11	34	88 (79)	1497	11.5

[6] Percent of acreage that is 20 or fewer ft. deep.

Table 2. Physical characteristics of the wild brook trout lakes surveyed in 1996-98 and of 475 wild brook trout lakes <=200 acres sampled statewide (con't).

Water	County	River drainage: Major	River drainage: Minor	Surface area (acres)	Depth Mean (ft)	Depth Max. (ft)	Littoral[7] acres (percent)	Eleva-tion (ft)	Maximum secchi reading (ft)
Mean				**138**	**11**	**29**	**90 (65)**	**1402**	**11.5**
Statewide mean of 475 brook trout lakes <= 200 A				**49**	**9**	**22**	**.**	**1233**	**10.5**

[7]Percent of acreage that is 20 or fewer ft. deep.

Table 3 Competing fish species present in wild brook trout study lakes. Numbers represent assigned competition value.

	Competing species[8]																			0-10 scale	Category
Lake	SKB	BNS	FHM	BKF	LWF	CSK	LKT	EEL	LNS	SCL	NRD	PRD	FSD	BND	SLT	WHS	CCB	GLS	LCB	All	
Daicey P											2.1									2.1	0.5	Low
Rock P											2.1								4.9	4.9	1.1	
Brown P																		4.7		6.8	1.5	
Beaver P														2.1					4.9	7.0	1.5	
Secret P															5.9			4.7		10.6	2.3	
Salmon P													1.9		5.9			4.7		12.5	2.7	Mod
Thissell P															5.9		6.7			12.6	2.7	
Johnston P														2.1	5.9			4.7		12.7	2.7	
Turner P (Big)														2.1			6.7		4.9	13.7	3.0	
Pillsbury P (Little)		2.5										2.5	1.9				6.7		4.9	18.5	4.1	
Coffelos P				3.1								2.5	1.9				6.7	4.7	4.9	23.8	5.2	High
B Pond								5.6								9.1		4.7	4.9	24.3	5.4	
Moxie P (Little)								5.6								9.1	6.7	4.7		26.1	5.7	
Kamankeag P									6.4	1.4		2.5		2.1		9.1	6.7		4.9	30.6	6.7	
Crosby P			2.7						6.4	1.4			1.9			9.1			4.9	33.1	7.3	
Clear L trophic	1.3				4.1	4.2	4.3							2.1	5.9	9.1			4.9	46.3	10.0	Oligo-
Competing species occurrence by lake	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**3**	**3**	**3**	**4**	**5**	**5**	**5**	**6**	**7**	**9**	**61**		

[8]BKF = banded killifish; BND = blacknose dace; BNS = blacknose shiner; CCB = creek chub; EEL = American eel; FHM = fathead minnow; FSD = finescale dace; GLS = golden shiner; LCB = lake chub; LKT = lake trout; LWF = lake whitefish; LNS = longnose sucker; NRD = northern redbelly dace; PRD = pearl dace; SCL = slimy sculpin; SKB = stickleback species; SLT = rainbow smelt; WHS = white sucker

Table 4. Regulation history and severity of wild brook trout study lakes, 1994-95 vs. 1996-98.

Water	Years	Minimum length limit (in)	Creel limit	Gear restriction	Regulation severity Value	Difference[9]
Pillsbury P	1994-95	6	5	None	0	
(Little)	1996-98	6	5	None	0	0
Johnston P	1994-95	6	5	No live fish as bait	0.5	
	1996-98	6	5	No live fish as bait	0.5	0
Beaver P	1994-95	6	5	Fly fishing only	2	
	1996-98	6	5	Fly fishing only	2	0
Kamankeag P	1994-95	6	5	Fly fishing only	2	
	1996-98	6	5	Fly fishing only	2	0
B Pond	1994-95	10	5	No live fish as bait	2.5	
	1996-98	10; 1>12	2	No live fish as bait	5	2.5
Moxie P	1994-95	10	5	No live fish as bait	2.5	
(Little)	1996-97	10; 1>12	2	Artificial lures only	5.5	3
	1998-99	12; 1>14	2	Artificial lures only	6.5	5
Turner P	1994-95	10	5	Artificial lures only	3	
(Big)	1996-98	10; 1>12	2	Artificial lures only	5.5	2.5
Clear L[10]	1994-95	12	2	None	5	
	1996-98	12; 1>14	2	None	5.5	0.5
Thissell P	1994-95	12	2	Artificial lures only	4	
	1996-98	12; 1>14	2	Artificial lures only	6	2
Crosby P	1994-95	6	5	Fly fishing only	2	
	1996-98	10; 1>12	2	Fly fishing only	6.5	4
Daicey P	1994-95	6	5	Fly fishing only	2	
	1996-98	12; 1>14	2	Fly fishing only	7.5	5.5
Coffeelos P	1994-95	12	2	Artificial lures only	6	
	1996-98	12; 1>14	2	Fly fishing only	7.5	1.5
Secret P	1994-95	10	5	No live fish as bait	2.5	
	1996-98	18	1	Artificial lures only	9.5	7
Brown P	1994-95	12	2	Artificial lures only	6	
	1996-98	18	1	Artificial lures only	9.5	3.5

[9] Difference between regulation severities in 1994-95 and 1996-97.

[10] Clear Lake is also open to ice fishing from January 1 to March 31 annually with the same regulations in effect.

Rock P	1994-98	6	5	Fly fishing only	10[11]	0
Salmon P	1994-95		0	Artificial lures only	10	
	1996-98		0	Artificial lures only	10	0

11[11] Rock Pond has a *de facto* no-kill regulation imposed by the nearby angling club, whose members fish the pond exclusively.

Table 5. Work summary for wild brook trout study lakes, 1994-98.

		Summer fishing season			Post-fishing season					
					Population estimate		Standing crop		Relative abundance of	
Water	Year	Angler-use estimate	Brook trout catch and harvest estimates	Voluntary creel survey data	Brook trout	Competing species	Brook trout	Competing species	competing species	Brook trout age & growth
B Pond	1996				X		X		X	X
	1997				X		X		X	X
	1998				X		X		X	X
Beaver P	1994	X	X		X		X			X
	1995				X		X		X	X
	1996			X	X		X		X	X
Brown P	1994				X		X			X
	1995				X		X			X
	1997				X		X		X	X
	1998				X		X		X	X
Clear L	1996			X	X		X			X
	1997				X	X	X	X	X	X
	1998				X		X		X	X
Coffeelos	1996									X
Crosby P	1996				X		X		X	X
	1997	X	X		X		X		X	X
	1998				X		X		X	X
Daicey P	1996				X		X		X	X
	1997				X		X			X
Johnston	1996				X		X		X	X
	1998				X		X		X	X
Kamankeag	1996				X		X		X	X
	1997				X	X	X	X	X	X

Table 5. Work summary for wild brook trout study lakes, 1994-98 (con't).

		Summer fishing season			Post-fishing season					
					Population estimate		Standing crop		Relative abundance of	
Water	Year	Angler-use estimate	Brook trout catch and harvest estimates	Voluntary creel survey data	Brook trout	Competing species	Brook trout	Competing species	competing species	Brook trout age & growth
Moxie P	1994	X	X		X	X	X	X		X
(Little)	1995	X	X		X	X	X	X		X
	1996			X	X	X	X	X		X
	1997			X	X		X		X	X
	1998	X	X	X	X		X		X	X
Pillsbury	1996				X		X		X[12]	X
(Little)	1997				X		X		X	X
	1998				X		X		X	X
Rock P	1997				X	X	X	X		X
	1998				X	X	X	X	X	X
Salmon P	1995				X	X	X	X		X
	1997				X		X		X	X
Secret P	1995	X	X		X	X	X	X		X
Thissell	1998				X		X		X	X
Turner P	1996				X	X	X	X	X	X
(Big)	1997				X		X			X
	1998				X		X		X	X
All	**1994**	**2**	**2**	**0**	**3**	**1**	**3**	**1**	**0**	**3**
	1995	**2**	**2**	**0**	**5**	**3**	**5**	**3**	**1**	**5**
	1996	**0**	**0**	**3**	**10**	**2**	**10**	**2**	**8**	**11**
	1997	**1**	**1**	**1**	**11**	**3**	**11**	**3**	**8**	**11**
	1998	**1**	**1**	**1**	**10**	**1**	**10**	**1**	**10**	**10**

12[12] WHS only

Table 5. Work summary for wild brook trout study lakes, 1994-98 (con't).

		Summer fishing season			Post-fishing season					
					Population estimate		Standing crop		Relative abundance of competing species	Brook trout age & growth
Water	Year	Angler-use estimate	Brook trout catch and harvest estimates	Voluntary creel survey data	Brook trout	Competing species	Brook trout	Competing species		
All	**All**	**6**	**6**	**5**	**39**	**10**	**39**	**10**	**27**	**40**

Table 6. Post-season trapnetting schedules and associated water temperatures for brook trout study ponds, 1994-98.

Water	Year	No. nets	Date set	Water temp.	Date pulled	Water temp.	No. days	Net days[13]	Net hours[14]
B Pond	1996	3	Sept 17	57[15]	Oct 21	52[16]	34	102	2448
	1997	3	Sept 20	63	Oct 23	46	33	99	2376
	1998	3	Sept 21	63	Oct 26	46	35	105	2520
Beaver P	1994	2	Oct 3	48	Nov 1	48	30	60	1440
	1995	2	Sept 19	59	Oct 18	46	30	60	1440
	1996	2	Sept 20	57	Oct 30	39	41	82	1968
Brown P	1994	2	Oct 2	.	Oct 5	.	3	6	144
	1995	2	Oct 2	.	Oct 6	.	4	8	185
	1997	2	Sept 29	.	Oct 2	.	3	6	144
	1998	2	Oct 14	48	Oct 16	48	2	4	96
Clear L	1996	2	Oct 7	49	Nov 8	42	33	66	1584
	1997	2	Oct 10	52	Nov 12	37	33	66	1584
	1998	2	Oct 9	52	Nov 6	43	28	56	1344
Coffeelos P	1996	2	Sept 30		Oct 4	.	4	8	174
Crosby P	1996	2	Sept 25	57	Oct 23	48	28	56	1344
	1997	2	Sept 22	48	Oct 28	43	36	72	1728
	1998	2	Sept 23	61	Oct 30	45	37	74	1776
Daicey P	1996	2	Oct 16	45[17]		.	.	.	.
	1997	2	Sept 20	61	Oct 27	46	37	74	1776
Johnston P	1998	2	Sept 25	60	Oct 23	48	28	56	1344
Kamankeag P	1996	2	Sept 20	59	Nov 1	39	42	84	2016
	1997	2	Sept 23	55	Oct 28	34	41	68	1632

[13] Calendar days netted x no. of nets used

[14] Hours netted x no. of nets used

[15] First temperature recorded on Sept 22

[16] Final temperature recorded on Oct 9

[17] First temperature recorded on Oct 28

Moxie P	1994	4	Oct 13	54	Oct 25	45	12	39	931
(Little)	1995	4	Oct 13	58	Oct 25	46	12	45	1051
	1996	4	Oct 16	.	Oct 24	.	8	32	928
	1997	4	Oct 14	.	Oct 21	.	7	28	672
	1998	4	Oct 12	50	Oct 20	48	8	32	928
Pillsbury P	1996	1	Sept 25	56	Oct 24	44	29	29	696
(Little)	1997	1	Oct 9	54	Nov 7	43	29	29	696
	1998	1	Sept 30	59	Oct 27	43	27	27	648
Rock P	1997	2	Sept 22	48	Oct 28	32	36	72	1728
	1998	2	Sept 23	55	Oct 23	41	30	60	1440

Table 6. Post-season trapnetting schedules and associated water temperatures for brook trout study ponds, 1994-98 (con't).

Water	Year	No. nets	Date set	Water temp.	Date pulled	Water temp.	No. days	Net days[18]	Net hours[19]
Salmon P	1995	2	Oct 2	.	Oct 23	.	21	35	788
	1997	2	Oct 6	.	Oct 14	.	8	16	384
Secret P	1995	2	Oct 2	.	Oct 13	.	11	22	514
Thissell P	1998	2	Sept 28	59	Oct 2	55	4	8	192
Turner P	1996	3	Oct 6	.	Oct 9	.	3	9	201
(Big)	1997	3	Oct 6	.	Oct 10	.	4	12	238
	1998	3	Oct 5	.	Oct 8	.	3	9	216
Mean		**2.3**	**Sept 30**	**55**	**Oct 20**	**44**	**21**	**45**	**1087**
Range		**1-4**	**Sept 17-Oct 16 (30 days)**	**45-63**	**Oct 2-Nov 12 (42 days)**	**32-55**	**2-42**	**4-105**	**96-2520**

[18] Calendar days netted x no. of nets used

[19] Hours netted x no. of nets used

Table 7. Creel survey summaries for wild trout lakes, 1994-98.

Water	Beaver P				Clear L	Crosby P	Little Moxie P			
Year:	1994	1995	1996	1997	1996	1997	1994	1995	1996	1998
Creel survey type:	Vol.	Vol.	Vol.	Vol.	Vol.	Clerk	Clerk	Vol.	Vol.	Vol.
No. anglers surveyed	35	53	33	18	41	30	88	77	105	90
No. angler hours	69	.	50	32	197	88	343	286	367	311
No. (%) anglers successful	21 (60)	45 (85)	24 (73)	12 (67)	16 (39)	12 (40)	23 (26)	21 (27)	.	42 (47)
No. legal BKT kept	9	24	13	3	13	11	41	42	58	25
No. (%) legal BKT released	60 (87)	257 (91)	67 (84)	24 (89)	6 (30)	9 (45)	2 (5)	6 (13)	49 (46)	44 (64)
No. (%) sublegal BKT released	19 (22)	3 (3)	25 (24)	39 (59)	3 (14)	16 (44)	30 (41)	20 (29)	57 (35)	172 (71)
No. legal BKT per angler (those kept)	1.7 (0.2)	5.3 (0.5)	2.4 (0.4)	1.5 (0.2)	0.5 (0.2)	0.67 (0.37)	0.5 (0.5)	0.64 (0.56)	1.02 (0.55)	0.77 (0.28)
Hrs. to catch a legal BKT (all legals)	1.0	.	0.6	1.2	10.4	4.4	7.9	6.0	3.4	4.5
Mean ln. in mm ± SE (no.) BKT sampled	282±48 (7)	218±48 (88)	.	184 (12)	430±13 (27)	305±14 (11)	294±30 (6)	282 (12)	313 (103)	
Mean wgt. in g ± SE (no.) BKT sampled	305±88 (4)	.	.	.	842±84 (12)	297±52 (11)	220±20 (2)	269 (12)	.	
No. BKT hvstd. ± CI	24±0	.	.	.	.	112±44	98±44	150	.	228
No. BKT harvested/a	1.20	.	.	.	.	0.75	1.34	2.05	.	3.12
Wgt. of BKT hvstd. (lb/a)	0.81	.	.	.	.	0.49	0.65	1.22	.	
No. angler trips ± CI	122±0	.	.	.	.	305±119	195±87	270±126	.	814
Angler trips/acre	6.1	.	.	.	.	2.0	2.7	3.7	.	11.2

Table 7. Creel survey summaries for wild trout lakes, 1994-98 (con't).

	Water							
	Salmon	Secret	All					
Year:	1995	1995	1994[20]		1995		1996	
Creel survey type:	Vol.	Vol.	Vol.	Clerk	Vol.	Clerk	Vol.[21]	Clerk
No. anglers surveyed	55	120	35	88	175	77	74	105
No. angler hours	115	379	69	343	494	286	247	367
No. (%) anglers successful	11 (20)	55 (46)	21 (60)	23 (26)	66 (38)	21 (27)	40 (54)	.
No. legal BKT kept	0[22]	57	9	41	57	42	26	58
No. (%) legal BKT released	15 (N/A)	40 (41)	60 (87)	2 (5)	55 (49)	6 (13)	73 (74)	49 (46)
No. (%) sublegal BKT released	N/A	112 (54)	19 (22)	30 (41)	112 (50)	20 (29)	28 (22)	57 (35)
No. legal BKT per angler (those kept)	0.32 (0)	0.94 (0.48)	1.70 (0.21)	0.5 (0.5)	0.64 (0.33)	0.64 (0.56)	1.34 (0.35)	1.02 (0.55)
Hrs. to catch a legal BKT (all legals)	7.7	3.9	1.0	7.9	4.4	6.0	2.5	3.43
Mean ln. in mm ± SE (no.) BKT sampled	343 (15)	319 (2)	282±48 (7)	294 (6)	340 (17)	282 (12)	.	313 (103)
Mean wgt. in g ± SE (no.) BKT sampled	.	312 (2)	305±88 (4)	220 (2)	312 (2)	269 (12)	.	.
No. BKT harvested ± CI	0	186	24±0	98±44	.	150	.	.
No. BKT harvested/a	0	13.29	1.20	1.34	.	2.05	.	.
Wgt. of BKT hvstd. (lb/a)	0	9.1	0.8	0.7	.	1.2	.	.
No. angler trips ± CI	.	385±197	122±0	195±87	.	270±126	.	.
Angler trips/acre	.	27.5	6.1	2.7	.	3.7	.	.

[20] Excludes Beaver P, for which angler hours are missing.

[21] Excludes Clear Lake data.

[22] Catch-and-release regulation in effect.

Table 7. Creel survey summaries for wild trout lakes, 1994-98 (con't).

Year:	1997		1998	All	1994-95	1996-97	All	All
Creel survey type:	Vol.	Clerk	Vol.	**Vol.**	Clerk	Clerk	**Clerk**	**All**
No. anglers Surveyed	18	30	90	**349**	165	227	**392**	**741**
No. angler hours	32	88	311	**956**	629	734	**1,363**	**2,319**
No. (%) anglers successful	12 (67)	12 (40)	42 (47)	**165 (47)**	44 (27)	12 (5)	**56 (14)**	**221 (30)**
No. legal BKT kept	3	11	25	**107**	83	98	**181**	**288**
No. (%) legal BKT released	24 (89)	9 (45)	44 (64)	**250 (70)**	8 (9)	155 (61)	**163 (47)**	**413 (59)**
No. (%) sublegal BKT released	39 (59)	16 (44)	172 (71)	**367 (49)**	50 (35)	140 (36)	**190 (36)**	**557 (44)**
No. legal BKT per angler (those kept)	1.5 (0.2)	0.67 (0.37)	0.77 (0.28)	**1.02 (0.31)**	0.55 (0.50)	1.11 (0.43)	**0.88 (0.46)**	**0.95 (0.39)**
Hrs. to catch a legal BKT (all legals)	1.2	4.4	4.5	**2.7**	6.9	2.9	**4.0**	**3.3**
Mean ln. in mm ± SE (no.) BKT sampled	184 (12)	305±14 (11)	.	**218 (36)**	286 (18)	323 (153)	**319 (171)**	**301 (207)**
Mean wgt. in g ± SE (no.) BKT sampled	.	297±52 (11)	.	**305 (4)**	276 (14)	581 (23)	**466 (37)**	**450 (41)**
No. BKT hvested. ± CI	.	122±44	228	**126**	290	112±44	**402**	**528**
No. BKT harvested/a	.	0.8	3.1	**2.2**	1.7	0.8	**1.4**	**1.8**
Wgt. of BKT hvstd. (lb/a)	.	0.5	.	**0.8**	3.0	0.5	**0.8**	**0.8**
No. angler trips ± CI	.	305±119	814	**936**	487	305±119	**792**	**1,728**
Angler trips/acre	.	2.0	11.2	**8.7**	10.0	**2.0**	**2.8**	**5.8**

Table 8. Mean length (mm) and weight (g) by age of brook trout harvested from wild brook trout lakes during the summers of 1994-96. Sample size in parentheses.

Water	Survey type	Year	Size variable	Ages II+	III+	IV+	V+	All
Beaver P	Vol.	1994	Length		274±47 (6)	330 (1)		282±48 (7)
			Weight		312±101 (3)	284 (1)		305±88 (4)
	Vol.	1996	Length		270±10 (2)	254±0 (3)		260±5 (5)
			Weight		163±38 (2)	170±0 (3)		167±12 (5)
		All	Length		273±38 (8)	273±33 (4)		273±30 (12)
			Weight		252±76 (5)	199±49 (4)		228±46 (9)
Crosby P	Clerk	1997	Length	230±21 (2)	286±9 (7)	309±13 (3)	426 (1)	293±14 (13)
			Weight	118±38 (2)	227±22 (7)	295±28 (3)	790 (1)	269±48 (13)
Little Moxie P	Clerk	1994	Length		282±20 (5)	347 (1)		294±30 (6)
			Weight		220±20 (2)			220±20 (2)
		1995	Length		278±5 (11)	321 (1)		281±6 (12)
			Weight		257±20 (11)	400 (1)		269±22 (12)
		All	Length		279±10 (16)	334±13 (2)		285±14 (18)
			Weight		251±20 (13)	400 (1)		262±22 (14)
All	**Clerk**	**All**	**Length**	**230±21 (2)**	**281±9 (23)**	**319±13 (5)**	**426 (1)**	**288±14 (31)**
			Weight	**118±38 (2)**	**243±21 (20)**	**321 (4)**	**790 (1)**	**265±35 (27)**
	Vol.	**All**	**Length**		**273±38**	**273±33**		**273±30**

				(8)	(4)		(12)
		Weight		252±76	199±49		228±46
				(5)	(4)		(9)
All	All	Length	230±21	279±17	299±22	426	284±18
			(2)	(31)	(9)	(1)	(43)
		Weight	118±38	281±32	260±35	790	281±32
			(2)	(25)	(8)	(1)	(36)

Table 9. Number, mean lengths (mm), and standard errors of brook trout kept and released, as reported by Beaver Pond anglers, 1994-96.

	Brook trout					Kept				
	Released									
	> 6 in		> 10 in		Percent	> 6 in		> 10 in		Percent
Year	No.	Length	No.	Length	> 10 in	No.	Length	No.	Length	> 10 in
1994	19	302±56	15	323±42	79	189	196±4	32	265±17	17
1995	12	288±27	12	288±27	100	211	201±38	31	268±18	15
1996	0		6	260±10	100	17	174±20	3	288±18	18
All	**31**	**295±47**	**27**	**306±41**	**89**	**400**	**200±39**	**63**	**266±18**	**16**

Table 10. Number and percent of legal-size brook trout caught and harvested from wild brook trout lakes by regulation severity (reg. sev.) and age group (older = age III+ and greater), 1994-97.

Water	Year	Creel survey type	Reg. sev.	Reg. sev. category	No. legal-size brook trout caught All	No. legal-size brook trout harvested All	No. legal-size brook trout harvested Older	Pop. est. All	Pop. est. Older	Harvest plus pop All	Harvest plus pop Older	Percent legal-size brook trout caught All	Percent legal-size brook trout harvested All	Percent legal-size brook trout harvested Older
Beaver P	1994	Vol.	2[23]	Low	241	24	24	378	80	402	104	60.0	6.0	23.1
	1995	Vol.			215	12	12	547	117	559	129	38.5	2.1	9.3
	Mean	**Vol.**		**Low**	**228**	**18**	**18**	**463**	**99**	**481**	**117**	**47.4**	**3.7**	**15.4**
Little	1994	Clerk	2.5[24]	Mod	95	91	91	666	39	757	130	12.5	12.0	70.0
Moxie P	1995	Vol.			171	150	150	416	115	566	265	30.2	26.5	56.6
Secret P	1995	Vol.	2.5[25]		362	186	.	248	0	434	.	83.4	42.9	.
	Mean	**All**		**Mod**	**209**	**142**	**.**	**443**	**.**	**586**	**.**	**35.7**	**24.2**	**.**
Crosby P	1997	Clerk	6.5[26]	High	316	112	95	539	357	651	452	48.5	17.2	21.0
Little	1998	Vol	5.5[27]		69	25	25	195	195	220	220	31.4	11.4	11.4

[23] 6 in min length; 5 fish limit; fly fishing only

[24] 10 in min length; 5 fish limit; no live fish as bait

[25] 10 in min length; 5 fish limit; no live fish as bait

[26] 10 in min length; 1 > 12 in; 2 fish limit; fly fishing only

Moxie P											
	Mean	**All**		**High**	**193**	**69**	**60**	**367**	**276**	**436**	**336**
44.3	**15.8**	**21.7**									
All	**All**	**All**	**All**	**All**	**1,469**	**600**	**518**	**2,989**	**1,079**	**3,589**	**1,615**
40.9	**16.7**	**32.1**									

[27] 12 in min length; 1 > 14 in; 2 fish limit; artificial lures only

Table 11. Number and (percent)of angled brook trout from study lakes that were kept and released by size group, 1994-96.

Water	Min. ln. (in)	Reg. sev.	Year	Inch-class <6 kept	<6 rel	6-10 kept	6-10 rel	10-12 kept	10-12 rel	12-14 kept	12-14 rel	14-16 kept	14-16 rel	16-18 kept	16-18 rel	All kept	All rel
Beaver P	6	2	1994	0	15	4	168	5	19	1	2	0	0	0	0	10	204
			1995	0	7	0	172	6	29	6	2	0	0	0	0	12	210
			1996	0	25	1	17	5	3	1	0	0	0	0	0	7	45
			All	**0**	**47**	**5**	**357**	**16**	**51**	**8**	**4**	**0**	**0**	**0**	**0**	**29**	**459**
				(0)		**(1)**		**(24)**		**(67)**						**(6)**	
Little Moxie P	10	2.5	1994	0	3	1	27	19	2	5	0	2	0	0	0	27	32
			1995	0	0	0	84	111	21	29	0	10	0	0	0	150	105
			Both	**0**	**3**	**1**	**111**	**130**	**23**	**34**	**0**	**12**	**0**	**0**	**0**	**177**	**137**
Secret P	10	2.5	1995	0	42	0	316	119	141	45	18	18	17	4	0	186	534
Crosby P	10	6.5	1997	0	0	2	16	6	9	4	0	0	0	1	0	13	25
						(11)		(40)		(100)				(100)		(34)	
10-in limit waters		**All**	**All**	**0**	**45**	**1**	**427**	**249**	**164**	**79**	**18**	**30**	**17**	**4**	**0**	**363**	**671**
				(0)		**(0.2)**		**(60)**		**(81)**		**(64)**		**(100)**		**(35)**	
All	**All**	**All**	**All**	**0**	**92**	**7**	**783**	**266**	**221**	**90**	**22**	**30**	**17**	**4**	**0**	**405**	**1,155**
				(0)		**(0.9)**		**(55)**		**(80)**		**(64)**		**(100)**		**(26)**	

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length. For waters with maximum depths >20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
B Pond	1996	No	163	415	108				686 (523-2068)
		No/a	0.25	0.65	0.17				1.07
		No/la	0.36	0.93	0.24				1.53
		Lb	47.31	120.78	31.54				199.63
		Lb/a	0.07	0.19	0.05				0.31
		Lb/la	0.11	0.27	0.07				0.45
	1997	No	194	330	27				551 (451-708)
		No/a	0.30	0.51	0.04				0.86
		No/la	0.43	0.74	0.06				1.23
		Lb	31.83	131.85	19.80				198.19
		Lb/a	0.05	0.20	0.03				0.31
		Lb/la	0.07	0.29	0.04				0.44
	1998	No	179	606	109	10			904 (685-1327)
		No/a	0.28	0.94	0.17	0.02			1.40
		No/la	0.40	1.36	0.24	1.02			2.02
		Lb	23.96	215.49	71.70	5.29			328.07
		Lb/a	0.04	0.33	0.11	0.01			0.51
		Lb/la	0.05	0.48	0.16	0.01			0.73
Beaver P	1994	No	55	244	70	10			378 (298-459)
		No/a	2.75	12.20	3.50	0.50			18.90
		Lb	3.64	44.65	30.10	5.80			84.23
		Lb/a	0.18	2.23	1.50	0.29			4.21
	1995	No	68	362	109	8			547 (517-578)
		No/a	3.42	18.10	5.43	0.40			27.35
		Lb	3.59	78.94	37.93	3.26			125.30
		Lb/a	0.18	3.95	1.90	0.16			6.27
	1996	No	216	240	69	10			500 (363-803)
		No/a	10.80	12.00	3.45	0.50			25.00
		Lb	11.70	40.86	26.49	6.39			87.56
		Lb/a	0.59	2.04	1.32	0.32			4.38

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
Brown P	1997	No	172	328	68				568 (460-676)
		No/a	9.56	18.22	3.78				31.56
		Lb	24.81	173.54	64.75				273.39
		Lb/a	1.38	9.64	3.60				15.19
	1998	No	274	203	30	5			512 (419-606)
		No/a	15.22	11.28	1.67	0.28			28.44
		Lb	44.52	88.09	23.13	5.73			161.83
		Lb/a	2.47	4.89	1.28	0.32			8.99
Clear L	1996	No		116	80	5			206 (130-282)
		No/a		0.19	0.13	0.01			0.34
		No/la		0.50	0.34	0.02			0.88
		Lb		37.05	74.36	5.48			122.51
		Lb/a		0.06	0.12	0.01			0.20
		Lb/la		0.16	0.32	0.02			0.53
	1997	No		144	70	28	14		257 (198-315)
		No/a		0.23	0.11	0.05	0.02		0.42
		No/la		0.62	0.30	0.12	0.06		1.10
		Lb		52.49	63.06	42.25	26.83		174.0
		Lb/a		0.09	0.10	0.07	0.04		0.28
		Lb/la		0.23	0.27	0.18	0.12		0.75
	1998	No	2	23	103	28			156 (116-195)
		No/a	0.004	0.04	0.17	0.04			0.25
		No/la	0.009	0.10	0.44	0.12			0.67
		Lb	0.29	11.15	94.61	40.58			146.67
		Lb/a	0.0005	0.02	0.15	0.07			0.24
		Lb/la	0.001	0.05	0.41	0.17			0.63
Crosby P	1996	No	24	70	109	24			233 (174-354)
		No/a	0.16	0.47	0.73	0.16			1.55
		No/la	0.22	0.64	0.99	0.22			2.12
		Lb	1.83	12.24	48.93	25.83			100.31
		Lb/a	0.01	0.08	0.33	0.17			0.67
		Lb/la	0.02	0.11	0.44	0.23			0.91

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
Crosby P (con't)	1997	No	32	240	231	32	4		539
		No/a	0.21	1.60	1.54	0.21	0.03		3.59
		No/la	0.29	2.18	2.10	0.29	0.04		4.90
		Lb	0.99	38.91	105.77	27.74	3.48		147.43
		Lb/a	0.01	0.26	0.71	0.18	0.02		0.98
		Lb/la	0.01	0.35	0.96	0.25	0.03		1.34
	1998	No	55	255	255	103	7		675 (448-1366)
		No/a	0.37	1.70	1.70	0.69	0.05		4.50
		No/la	0.50	2.32	2.32	0.94	0.06		6.14
		Lb	1.90	50.20	113.48	82.21	9.10		269.33
		Lb/a	0.01	0.33	0.76	0.55	0.06		1.80
		Lb/la	0.02	0.46	1.03	0.75	0.08		2.45
Daicey P	1996	No	318	850	637				1805 (857-16806)
		No/a	8.36	22.40	16.8				47.50
		No/la	9.09	24.29	18.20				51.57
		Lb	162.34	434.43	325.59				922.36
		Lb/a	4.27	11.43	8.57				24.27
		Lb/la	4.64	12.41	9.30				26.35
	1997	No	283	439	186	10			918 (725-1251)
		No/a	7.45	11.55	4.89	0.26			24.16
		No/la	8.09	12.54	5.31	0.29			26.23
		Lb	39.21	101.72	98.97	13.22			256.80
		Lb/a	1.03	2.68	2.60	0.35			6.76
		Lb/la	1.12	2.91	2.83	0.38			7.34
Johnston P	1996	No	345	647	172				1379 (1164-1692)
		No/a	5.84	10.96	2.92				23.37
		No/la	10.15	19.03	5.06				40.56
		Lb	72.05	135.17	36.03				288.21
		Lb/a	1.22	2.29	0.61				4.88
		Lb/la	2.12	3.98	1.06				8.48

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
Johnston P (con't)	1998	No	848	1099	220				2166 (1792-2738)
		No/a	14.37	18.63	3.73				36.71
		No/la	24.94	32.32	6.47				63.71
		Lb	112.07	173.81	48.46				343.32
		Lb/a	1.90	2.94	0.82				5.82
		Lb/la	3.30	5.11	1.43				10.10
Kamankeag P	1996	No	342	159	92	8	25	8	635 (375-2068)
		No/a	8.55	3.98	2.30	0.20	0.63	0.20	15.88
		No/la	11.79	5.48	3.17	0.28	0.86	0.28	21.90
		Lb	9.34	8.25	21.63	11.01	40.57	15.68	125.88
		Lb/a	0.23	0.21	0.54	0.28	1.01	0.39	3.15
		Lb/la	0.32	0.28	0.75	0.38	1.40	0.54	4.34
	1997	No	106	204	60	8	8		385 (229-1213)
		No/a	2.65	5.10	1.51	0.19	0.19		9.63
		No/la	3.66	7.03	2.07	0.28	0.28		13.28
		Lb	2.31	14.33	7.23	5.73	10.04		40.56
		Lb/a	0.06	0.36	0.18	0.14	0.25		1.01
		Lb/la	0.08	0.49	0.24	0.20	0.35		1.40
Moxie P, Little	1994	No	143	208	36	3			390 (327-453)
		No/a	1.96	2.85	0.49	0.04			5.34
		Lb	9.76	54.98	22.28	4.6			86.58
		Lb/a	0.13	0.75	0.31	0.06			1.19
	1995	No	95	206	111		4		416 (350-482)
		No/a	1.30	2.82	1.52		0.05		5.70
		Lb	4.81	73.05	101.95		7.67		178.68
		Lb/a	0.07	1.00	1.40		0.11		2.45
	1996	No	538	409	201	48			1195 (1030-1360)
		No/a	7.37	5.60	2.75	0.66			16.37
		Lb	82.22	162.51	158.61	63.89			463.20
		Lb/a	1.13	2.29	2.17	0.88			6.35

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
Moxie P, Little (con't)	1997	No	607	218	63				888 (746-1030)
		No/a	8.32	2.98	0.86				12.16
		Lb	85.61	115.34	83.66				284.61
		Lb/a	1.17	1.58	1.15				3.90
	1998	No	525	695	199				1419 (1151-1688)
		No/a	7.19	9.52	2.72				19.44
		Lb	85.46	274.17	155.61				530.03
		Lb/a	1.17	3.76	2.13				7.26
Pillsbury P, Little	1996	No		22	17	5			43 (33-61)
		No/a		0.49	0.38	0.11			0.96
		Lb		5.72	6.67	2.79			14.78
		Lb/a		0.13	0.15	0.06			0.33
	1997	No		31	31	9			71 (54-101)
		No/a		0.69	0.69	0.20			1.58
		Lb		4.05	11.23	6.74			20.25
		Lb/a		0.09	0.25	0.15			0.45
	1998	No	23	41	7	7			78 (64-103)
		No/a	0.51	0.91	0.16	0.16			1.73
		Lb	2.61	12.14	4.27	6.60			27.06
		Lb/a	0.06	0.27	0.09	0.15			0.60
Rock P	1997	No	164	622	233	25			1033 (816-1409)
		No/a	6.32	23.96	8.98	0.95			39.73
		Lb	14.61	140.51	171.82	24.50			342.66
		Lb/a	0.56	5.40	6.61	0.94			13.18
	1998	No	6	227	172	12			418 (223-3389)
		No/a	0.24	8.74	6.62	0.47			16.01
		Lb	0.37	50.17	82.39	7.99			141.28
		Lb/a	0.01	1.93	3.17	0.31			5.43

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
Salmon P	1997	No	106	8	6				120 (73-167)
		No/a	8.89	0.66	0.49				10.00
		Lb	19.07	5.90	6.00				43.88
		Lb/a	1.59	0.49	0.50				3.66
Thissell P	1998	No	189	70	83	18			360 (189-532)
		No/a	1.34	0.50	0.59	0.13			2.55
		No/la	2.91	1.08	1.28	0.28			5.54
		Lb	43.30	43.75	109.33	38.06			234.16
		Lb/a	0.31	0.31	0.78	0.27			1.66
		Lb/la	0.67	0.67	1.68	0.59			3.60
Turner P, Big	1996	No	272	87	4				363 (206-520)
		No/a	2.45	0.78	0.04				3.27
		No/la	3.09	0.99	0.05				4.13
		Lb	53.92	78.38	8.99				116.74
		Lb/a	0.49	0.71	0.08				1.05
		Lb/la	0.61	0.89	0.04				1.33
	1997	No	528	200	6				815 (513-1118)
		No/a	4.76	1.81	0.05				7.34
		No/la	6.00	2.27	0.07				9.26
		Lb	75.82	97.50	9.73				183.05
		Lb/a	0.68	0.88	0.09				1.65
		Lb/la	0.86	1.11	0.11				2.08
	1998	No	700	247	21				967 (702-1231)
		No/a	6.31	2.23	0.19				8.71
		No/la	7.95	2.81	0.24				10.99
		Lb	94.05	118.90	21.39				233.66
		Lb/a	0.85	1.07	0.19				2.11
		Lb/la	1.07	1.35	0.24				2.66

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
All	**1994**	**No/a**	**2.36**	**7.53**	**2.00**	**0.27**			**12.12**
		No/la	**2.36**	**7.53**	**2.00**	**0.27**			**12.12**
		Lb/a	**0.16**	**3.85**	**1.11**	**0.11**			**3.73**
		Lb/la	**0.16**	**3.85**	**1.11**	**0.11**			**3.73**
		N	**2**	**2**	**2**	**2**	**0**	**0**	**2**
All	**1995**	**No/a**	**2.36**	**10.46**	**3.48**	**0.20**	**0.03**		**16.53**
		No/la	**2.36**	**10.46**	**3.48**	**0.20**	**0.03**		**16.53**
Lb/a		**0.13**	**2.48**	**1.65**	**0.08**	**0.06**	**4.36**		
		Lb/la	**0.13**	**2.48**	**1.65**	**0.08**	**0.06**		**4.36**
N		**2**	**2**	**2**	**1**	**1**	**0**	**2**	
All	**1994-1995**	**No/a**	**2.36**	**9.00**	**2.74**	**0.25**	**0.03**		**14.33**
		No/la	**2.36**	**9.00**	**2.74**	**0.25**	**0.03**		**14.33**
		Lb/a	**0.15**	**3.17**	**1.38**	**0.10**	**0.06**		**4.05**
		Lb/la	**0.15**	**3.17**	**1.38**	**0.10**	**0.06**		**4.05**
		N	**4**	**4**	**4**	**3**	**1**	**0**	**4**
All	**1996**	**No/a**	**4.38**	**5.75**	**2.97**	**0.16**	**0.06**	**0.02**	**13.53**
		No/la	**5.29**	**7.00**	**3.46**	**0.18**	**0.09**	**0.03**	**16.50**
		Lb/a	**0.80**	**1.94**	**1.39**	**0.17**	**0.10**	**0.04**	**4.56**
		Lb/la	**0.95**	**2.26**	**1.56**	**0.19**	**0.14**	**0.05**	**5.35**
		N	**8**	**10**	**10**	**6**	**1**	**1**	**10**
All	**1997**	**No/a**	**4.41**	**6.12**	**2.09**	**0.17**	**0.02**		**12.79**
		No/la	**4.69**	**6.54**	**2.25**	**0.19**	**0.03**		**13.70**
		Lb/a	**0.59**	**1.97**	**1.44**	**0.17**	**0.03**		**4.31**
		Lb/la	**0.62**	**2.05**	**1.51**	**0.19**	**0.05**		**4.52**
		N	**9**	**11**	**11**	**6**	**3**	**0**	**11**
All	**1998**	**No/a**	**4.58**	**5.45**	**1.77**	**0.18**	**0.01**		**11.97**
		No/la	**5.98**	**7.04**	**2.22**	**0.23**	**0.01**		**15.47**
		Lb/a	**0.68**	**1.59**	**0.95**	**0.17**	**0.01**		**3.39**
		Lb/la	**0.88**	**1.90**	**1.16**	**0.23**	**0.01**		**4.25**
		N							**10**

Table 12. Post-season estimates of brook trout abundance and weight (lb) by ages for study waters, 1994-98. Estimates are for fish 6 inches and greater in length (con't). For waters with maximum depths > 20 ft., abundance is given for littoral acres (la).

Water	Year	Brook trout abundance variable	Ages I+	II+	III+	IV+	V+	VI+	All
All	**1996-1998**	**No/a**	**4.45**	**5.78**	**2.27**	**0.17**	**0.03**	**0.01**	**12.77**
		No/la	**5.30**	**6.85**	**2.62**	**0.20**	**0.04**	**0.01**	**15.18**
		Lb/a	**0.69**	**1.84**	**1.27**	**0.17**	**0.04**	**0.01**	**4.09**
		Lb/la	**0.81**	**2.07**	**1.41**	**0.20**	**0.06**	**0.02**	**4.70**
		N	**17**	**21**	**21**	**12**	**4**	**1**	**21**
All	**All**	**No/a**	**4.33**	**6.32**	**2.37**	**0.18**	**0.03**	**0.01**	**13.28**
		No/la	**4.96**	**7.09**	**2.64**	**0.20**	**0.04**	**0.01**	**15.08**
		Lb/a	**0.62**	**1.85**	**1.27**	**0.16**	**0.04**	**0.01**	**4.03**
		Lb/la	**0.72**	**2.05**	**1.37**	**0.17**	**0.06**	**0.02**	**4.51**
		N	**21**	**25**	**25**	**15**	**5**	**1**	**25**

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting.[28]

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
B Pond	1996	Length	175±8	221±9	306±14				222±9
			(9)	(23)	(5)				(37)
		Weight	69±10	120±15	278±41				132±16
			(7)	(23)	(5)				(35)
	1997	Length	177±6	263±4	321±18				235±5
			(36)	(61)	(5)				(102)
		Weight	75±7	181±9	333±67				163±10
			(22)	(61)	(5)				(88)
	1998	Length	184±8	257±4	311±7	312			250±5
			(18)	(61)	(11)	(1)			(91)
		Weight	61±9	161±9	299±28	240			165±10
			(13)	(59)	(11)	(1)			(84)
Beaver P	1994	Length	151±5	204±4	275±9	305±15			212±5
			(11)	(49)	(14)	(2)			(76)
		Weight	30±3	83±5	195±17	263±63			101±8
			(11)	(49)	(14)	(2)			(76)
	1995	Length	131±4	212±2	250±4	278±5			211±3
			(17)	(90)	(27)	(2)			(137)
		Weight	24±3	99±3	158±10	185±55			104±4
			(15)	(15)	(26)	(2)			(132)
	1996	Length	137±2	199±4	259±5	306±17			184±5
			(44)	(49)	(14)	(2)			(109)
		Weight	25±2	77±4	174±13	290±50			79±7
			(30)	(48)	(14)	(2)			(94)
Brown P	1995	Length	173±7	251±8	321±10				237±11
			(8)	(13)	(4)				(25)

[28] Rows are not additive if not all fish were aged.

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting (con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
Brown P (con't)	1997	Length	190±4 (33)	289±3 (63)	355±8 (13)				269±5 (148)
		Weight	65±4 (33)	240±7 (63)	432±28 (13)				219±11 (145)
	1998	Length	199±3 (54)	274±4 (40)	346±5 (6)	400 (1)			240±5 (101)
		Weight	74±4 (53)	197±9 (39)	350±20 (6)	520 (1)			144±10 (99)
Clear L	1996	Length		253±5 (23)	344±11 (16)	356±44 (2)			293±9 (41)
		Weight		145±10 (23)	422±40 (16)	498±203 (2)			270±29 (41)
	1997	Length		262±5 (41)	346±8 (20)	406±18 (8)	448±19 (4)		309±5 (174)
		Weight		165±12 (41)	409±28 (20)	685±78 (8)	870±114 (4)		307±16 (174)
	1998	Length	209 (1)	289±9 (10)	354±45 (45)	407±8 (12)			352±5 (101)
		Weight	65	220±24	417±18	658±47			427±18
Coffeelos P	1996	Length	250±13 (8)	331±4 (9)	393±3 (24)	441±3 (9)			358±11 (52)
		Weight	144±23 (7)	371±16 (9)	687±21 (24)	987±26 (9)			583±42 (51)
Crosby P (11)	1996 (33)	Length	154±4 (51)	200±4 (11)	267±5 (3)	349±13	391±6 (109)		247±6
		Weight	35±5 (7)	79±5 (33)	204±11 (51)	489±54 (11)	630±19 (3)		195±16 (105)
	1997	Length	121±2 (7)	198±4 (53)	250±4 (51)	339±15 (7)	334 (1)		225±5 (119)
		Weight	14±1 (7)	74±5 (53)	150±9 (51)	394±52 (7)	395 (1)		124±9 (119)

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting(con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
Crosby P	1998	Length	122±3	207±4	267±5	326±5	381		245±6
			(8)	(37)	(37)	(15)	(1)		(100)
(con't)		Weight	16±2	89±6	202±12	362±17	590		181±14
			(7)	(37)	(37)	(15)	(1)		(99)
Daicey P	1996	Length	113±5	228±16	319±5				240±19
			(3)	(8)	(6)				(17)
		Weight	.	151±10	340±37				232±30
				(8)	(6)				(14)
	1997	Length	185±4	225±4	287±9	410			227±5
			(29)	(45)	(19)	(1)			(94)
		Weight	63±4	105±5	242±23	600			127±10
			(26)	(45)	(19)	(1)			(91)
Johnston P	1996	Length	148±14	184±5	224±5	260±11			192±8
			(8)	(15)	(4)	(5)			(32)
		Weight	42±22	70±9	120±11	178±28			95±12
			(3)	(14)	(4)	(5)			(26)
	1998	Length	161±8	195±6	226±15				185±5
			(27)	(35)	(7)				(69)
		Weight	60±6	72±8	100±20				72±5
			(16)	(33)	(7)				(56)
Kamankeag P	1996	Length	120±2	145±2	221±13	386	420	440	160±9
(41)	(19)		(11)	(1)	(3)	(1)	(76)		Weight
13±1	24±2		107±21	625	737	890	90±26		
			(41)	(19)	(11)	(1)	(3)	(1)	(76)
	1997	Length	115±2	157±5	192±9	330	374		159±7
			(14)	(27)	(8)	(1)	(1)		(51)
		Weight	10±1	32±4	55±9	325	570		48±13
			(11)	(27)	(7)	(1)	(1)		(47)

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting(con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
Moxie P, Little	1994	Length	148±4 (44)	227±5 (64)	301±4 (11)	405 (1)			187±2 (491)
		Weight	31±3 (44)	120±7 (63)	281±19 (7)	700 (1)			70±4 (379)
	1995	Length	134±3 (28)	252±5 (1)	343±5		447 (110)		244±8
(24)	(52)	Weight	23±2 (24)	161±11 (52)	417±19 (27)		870 (1)		195±17 (110)
	1996	Length	199±5 (81)	289±6 (51)	362±5 (25)	430±5 (6)			258±6 (166)
		Weight	96±8 (79)	286±19 (51)	568±31 (24)	958±31 (6)			255±19 (163)
	1997	Length	200±4 (67)	268±8 (24)	378±11 (7)				230±3 (403)
		Weight	64±4 (67)	198±25 (24)	603±48 (7)				123±6 (399)
	1998	Length	214±6 (37)	277±2 (49)	331±7 (14)				261±5 (100)
		Weight	74±9 (32)	179±6 (49)	355±27 (14)				170±11 (95)
Pillsbury P, Little	1996	Length		229±3 (14)	262± (11)	314±18 (3)			252±5 (33)
Weight			118±5	178±15 (14)	253±30 (11)	(3)		156±10	(33)
	1997	Length		184±6 (10)	251±9 (10)	321±9 (3)			227±6 (53)
		Weight		59±5 (10)	165±19 (10)	340±38 (3)			129±12 (53)

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting(con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
Pillsbury P, Little (con't)	1998	Length	166±7 (10)	233±6 (18)	303±4 (3)	356±10 (3)			236±8 (64)
		Weight	52±5 (10)	134±10 (18)	277±9 (3)	428±68 (3)			158±15 (64)
Rock P	1997	Length	163±5 (20)	226±3 (76)	326±9 (27)	353±26 (3)			240±6 (126)
		Weight	40±4 (20)	103±4 (76)	335±23 (27)	445±125 (3)			151±12 (126)
	1998	Length	151 (1)	222±4 (37)	290±4 (28)	331±35 (2)			252±6 (68)
		Weight	28 (1)	100±6 (37)	218±11 (28)	303±98 (2)			153±10 (68)
Salmon P	1995	Length	187±5 (46)	279±23 (4)	429±11 (6)				213±12 (56)
		Weight	74±6 (45)	246±59 (4)	943±76 (6)				181±38 (55)
	1997	Length	185±4 (54)	305±14 (4)	454±8 (3)				210±10 (62)
		Weight	82±6 (54)	335±52 (4)	1100±92 (3)				166±34 (62)
Secret P	1995	Length	200±3 (28)	306±4 (2)	379 (1)				212±8 (31)
		Weight	67±4 (28)	243±8 (2)	590 (1)				95±19 (31)
	1997	Length	190±20 (2)	282±5 (9)					
		Weight	65±15 (2)	224±16 (8)					

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting(con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
Thissell P	1998	Length	218±4 (43)	294±4 (16)	371±10 (19)	440±7 (4)			279±9 (82)
		Weight	104±7 (43)	284±19 (16)	598±54 (19)	960±18 (4)			295±31 (82)
Turner P, Big	1996	Length	208±4 (72)	328±9 (23)	448 (1)				222±6 (162)
		Weight	90±6 (71)	409±33 (23)	1020 (1)				147±14 (144)
	1997	Length	191±3 (92)	276±5 (35)	357±10 (14)	405 (1)			201±5 (240)
		Weight	65±3 (92)	221±14 (35)	489±43 (14)	775 (1)			111±9 (240)
	1998	Length	190±3 (68)	276±7 (24)	372±16 (2)				216±5 (94)
		Weight	61±3 (68)	219±18 (24)	463±103 (2)				110±10 (94)
All	1994	Length	160±5 (19)	214±4 (62)	285±9 (18)	305±15 (2)			218±5 (101)
		Weight	30±3 (11)	83±5 (49)	200±16 (15)	263±63 (2)			103±8 (77)
	1995	Length	171±3 (115)	229±3 (148)	307±7 (73)	292±3 (3)	447 (1)		227±4 (341)
		Weight	54±4 (112)	127±6 (146)	344±28 (71)	257±78 (3)	870 (1)		152±9 (334)
	1996	Length	182±3 (249)	236±4 (241)	302±5 (152)	368±11 (37)	405±11 (6)	440 (1)	240±3 (686)
		Weight	72±4 (235)	170±10 (240)	338±19 (151)	618±56 (37)	683±50 (6)	890 (1)	204±9 (670)

Table 13. Mean length (mm), and weight (g) of brook trout by age for wild brook trout study lakes sampled during fall trapnetting(con't).

Water(s)	Year	Size variable	Ages I+	II+	III+	IV+	V+	VI+	All
All	1997	Length	184±2	241±2	295±5	340±9	378±27		228±2
			(354)	(410)	(174)	(19)	(3)		(1,405)
		Weight	64±2	147±4	287±15	404±37	585±114		140±4
			(328)	(408)	(173)	(19)	(3)		(1,376)
	1998	Length	193±2	248±2	303±4	351±9	381		242±2
			(266)	(327)	(133)	(28)	(1)		(755)
		Weight	71±2	153±4	297±15	454±42	590		164±5
			(243)	(322)	(133)	(28)	(1)		(727)
All	**All**	**Length**	**184±1**	**239±1**	**300±3**	**353±6**	**399±11**	**440**	**233±1**
			(1,003)	**(1,188)**	**(551)**	**(89)**	**(11)**	**(1)**	**(3,288)**
		Weight	66**±1**	**148±3**	**308±9**	**501±30**	**665±45**	**890**	**159±3**
			(929)	**(1,165)**	**(543)**	**(89)**	**(11)**	**(1)**	**(3,184)**

Table 14. Proportion and average sizes of older brook trout sampled by year group.

		Number and (%) of brook trout:		Mean sizes of brook trout:			
				age III+ and older		age IV+ and older	
Year group	All	age III+ and older	age IV+ and older	Length	Weight	Length	Weight
1994-95	441	97 (22.0)	6 (1.4)	303±6	322±23	322±26	361±109
1996-98	2,402	555 (23.1)	95 (4.0)	310±3	345±10	361±6	533±28
1994-98	2,843	652 (22.9)	101 (3.6)	309±4	342±13	359±6	523±31
Chi square = 0.260		P=0.610		Chi square = 7.320	P=0.007		

Table 15. Numbers and (percent) of brook trout sampled from study ponds during the fall by regulation severity, water, ages, and maturity.

Water	Reg. sev.	Year(s)	Maturity	Ages 0+	I+	II+	III+	IV+	V+	VI+	All
B Pond	5	1996-1998	Immature		55	80	6	0			141
					(87)	(57)	(29)	(0)			(63)
			Mature		8	60	15	1			84
					(13)	(43)	(71)	(100)			(37)
			All		63	140	21	1			225
Beaver P	2	1994-1996	Immature		52	37	0	0			89
					(90)	(31)	(0)	(0)			(41)
			Mature		6	84	35	4			129
					(10)	(69)	(100)	(100)			(59)
			All		58	121	35	4			218
Brown P	6	1994-1995	Immature		8	1	0				9
					(100)	(8)	(0)				(36)
			Mature		0	12	4				16
					(0)	(92)	(100)				(64)
			All		8	13	4				25
	9.5	1997-1998	Immature		41	0	0	0			41
					(47)	(0)	(0)	(0)			(20)
			Mature		46	103	19	1			169
					(53)	(100)	(100)	(100)			(80)
			All		87	103	19	1			109
Clear L	5.5	1996-1998	Immature		1	56	18	2	0		77
					(100)	(76)	(22)	(9)	(0)		(43)
			Mature			18	62	20	4		104
						(24)	(78)	(91)	(100)		(57)
			All		1	74	80	22	4		181
Crosby P	6.5	1996-1998	Immature		19	50	20	2	0		91
					(86)	(45)	(16)	(7)	(0)		(31)
			Mature		3	62	106	28	5		204
					(14)	(55)	(84)	(93)	(100)		(69)
			All		22	112	126	30	4		295

Table 15. Numbers and (percent) of brook trout sampled from study ponds during the fall by regulation severity, water, ages, and maturity (con't).

Water	Reg. sev.	Year(s)	Maturity	Ages 0+	I+	II+	III+	IV+	V+	VI+	All
Daicey P	7.5	1996-1998	Immature		32	50	7	0			89
					(100)	(78)	(23)	(0)			(69)
			Mature		0	14	23	3			40
					(0)	(22)	(77)	(100)			(31)
			All		32	64	30	3			129
Johnston P	0.5	1996, 1998	Immature		10	8	0	0			18
					(29)	(16)	(0)	(0)			(18)
			Mature		24	41	11	5			81
					(71)	(84)	(100)	(100)			(81)
			All		34	49	11	5			99
Kamankeag P	2	1996-1997	Immature		45	39	7	0	0	0	91
					(100)	(89)	(39)	(0)	(0)	(0)	(80)
			Mature		0	5	11	2	4	1	23
					(0)	(11)	(61)	(100)	(100)	(100)	(20)
			All		45	44	18	2	4	1	114
Moxie P (Little)	2.5	1994-1995	Immature	5	21	16	0		0		42
				(100)	(88)	(31)	(0)		(0)		(38)
			Mature	0	3	36	28		1		68
				(0)	(13)	(69)	(100)		(100)		(62)
			All	5	24	52	28		1		110
Moxie P (Little)	5.5	1996-1997	Immature	3	61	5	0	0			69
				(100)	(41)	(7)	(0)	(0)			(26)
			Mature	0	87	70	32	6			195
				(0)	(59)	(93)	(100)	(100)			(74)
			All	3	148	75	32	6			264
Moxie P (Little)	6.5	1998	Immature		7	1	0				8
					(19)	(2)	(0)				(8)
			Mature		30	48	14				92
					(81)	(98)	(100)				(92)
			All		37	49	14				100

Table 15. Numbers and (percent) of brook trout sampled from study ponds during the fall by regulation severity, water, ages, and maturity (con't).

Water	Reg. sev.	Year(s)	Maturity	Ages 0+	I+	II+	III+	IV+	V+	VI+	All
Pillsbury P (Little)	0	1996-1998	Immature		6	9	3	0			18
					(67)	(21)	(13)	(0)			(22)
			Mature		3	33	21	8			65
					(33)	(79)	(88)	(100)			(78)
			All		9	42	24	8			83
Rock P	10	1997, 1998	Immature		21	61	7	0			89
					(100)	(64)	(13)	(0)			(52)
			Mature		0	34	45	4			83
					(0)	(36)	(87)	(100)			(48)
			All		21	95	52	4			172
Salmon P	10	1995-1997	Immature	3	12	0	0				15
				(100)	(12)	(0)	(0)				(13)
			Mature	0	88	8	9				105
				(0)	(88)	(100)	(100)				(88)
			All	3	100	8	9				120
Secret P	2.5	1995	Immature		23	0	0				23
					(79)	(0)	(0)				(45)
			Mature		6	12	10				28
					(21)	(100)	(100)				(55)
			All		29	12	1				51
Secret P	9.5	1997, 1998	Immature		2	0	0				2
					(100)	(0)	(0)				(10)
			Mature		0	10	9				19
					(0)	(100)	(100)				(90)
			All		2	10	9				21
Turner P (Big)	5.5	1996-1998	Immature	14	145	1	0	0			160
				(100)	(63)	(1)	(0)	(0)			(46)
			Mature	0	87	81	17	1			186
				(0)	(38)	(99)	(100)	(100)			(54)
			All	14	232	82	17	1			346

Table 15. Numbers and (percent) of brook trout sampled from study ponds during the fall by regulation severity, water, ages, and maturity (con't).

Water	Reg. sev.	Year(s)	Maturity	Ages 0+	I+	II+	III+	IV+	V+	VI+	All
Thissell P	6.0	1998	Immature	17	25	3	0	0			45
				(100)	(58)	(19)	(0)	(0)			(45)
			Mature	0	18	13	19	4			54
				(0)	(42)	(81)	(100)	(100)			(55)
			All	17	43	16	19	4			99
	Low (0-2.25)	**All**	**Immature**		**113**	**93**	**10**	**0**	**0**	**0**	**216**
					(77)	**(36)**	**(11)**	**(0)**	**(0)**	**(0)**	**(42)**
			Mature		**33**	**163**	**78**	**19**	**4**	**1**	**298**
					(23)	**(64)**	**(89)**	**(100)**	**(100)**	**(100)**	**(58)**
			All		**146**	**256**	**88**	**19**	**4**	**1**	**514**
	Moderate (2.5-4.75)	**All**	**Immature**	**5**	**44**	**16**	**0**		**0**		**65**
				(100)	**(83)**	**(25)**	**(0)**		**(0)**		**(40)**
			Mature	**0**	**9**	**48**	**38**		**1**		**96**
				(0)	**(17)**	**(75)**	**(100)**		**(100)**		**(60)**
			All	**5**	**53**	**64**	**38**		**1**		**161**
	High (5-7.25)	**All**	**Immature**	**34**	**320**	**141**	**26**	**2**	**0**		**523**
				(100)	**(58)**	**(29)**	**(11)**	**(5)**	**(0)**		**(39)**
			Mature	**0**	**233**	**346**	**207**	**40**	**5**		**831**
				(0)	**(42)**	**(71)**	**(89)**	**(95)**	**(100)**		**(61)**
			All	**34**	**553**	**487**	**233**	**42**	**5**		**1,354**
	Severe (7.5-10)	**All**	**Immature**	**3**	**106**	**111**	**14**	**0**			**234**
				(100)	**(44)**	**(41)**	**(13)**	**(0)**			**(37)**
			Mature	**0**	**134**	**159**	**96**	**8**			**397**
				(0)	**(56)**	**(59)**	**(87)**	**(100)**			**(63)**
			All	**3**	**240**	**270**	**110**	**8**			**631**
All	**All**	**All**	**Immature**	**42**	**583**	**361**	**50**	**2**	**0**	**0**	**1,038**
				(100)	**(59)**	**(34)**	**(11)**	**(3)**	**(0)**	**(0)**	**(39)**
			Mature	**0**	**409**	**716**	**419**	**67**	**10**	**1**	**1,622**
				(0)	**(41)**	**(66)**	**(89)**	**(97)**	**(100)**	**(100)**	**(61)**
			All	**42**	**992**	**1,077**	**469**	**69**	**10**	**1**	**2,660**

Table 16. Relative abundance of brook trout and competing fish species captured during post-season in study waters, 1994-98.

Percent Competition	Water	Year	Fish caught	BKT	Competing species[29] SUC	MIN	BUL	SLT	SCL	BKF	CSK	LWF	LKT	EEL	All	brook trout
Low	Beaver P	1995	No	158		508									508	23.7
			Lbs	36.2		14									14	72.1
		1996	No	178		606									606	22.7
			Lbs	31.2		16									16	66.1
	Brown P	1998	No	341		140									140	70.9
			Lbs	98		2.3									2	98
	Daicey P	1997	No	378		0			3						3	99.2
			Lbs	105.7		0									0	100.0
	Moxie P, Little	1998	No	507	25	515									540	48.4
			Lbs	1,370	8	19									27	99.3
	Rock P	1997	No	325		122									122	72.7
			Lbs	34.2		3.0									3	91.9
		1998	No	68		1									1	98.6
			Lbs	22.9		0.03									0	100.0
Mod	Johnston P	1998	No	750		110		347							457	62.1
			Lbs	119		.		.							.	
	Moxie P, Little	1996	No	724	188	560				2					750	49.1
			Lbs	209	99	12				<0.1					111	65.3
		1997	No	417	300	2,435									2,735	13.2
			Lbs	113	78	49									127	47.1

Table 16. Relative abundance of brook trout and competing fish species captured during post-season in study waters, 1994-98 (con't).

Percent

[29] BKT = brook trout; SUC = sucker species; MIN = minnow species; BUL = brown bullhead; SLT = rainbow smelt; SCL = slimy sculpin; BKF = banded killifish; CSK = burbot (cusk); LWF = lake whitefish; LKT = lake trout; EEL = American eel.

Competition	Water	Year	Fish caught	BKT	Competing species SUC	MIN	BUL	SLT	SCL	BKF	CSK	LWF	LKT	EEL	All	brook trout
Mod (con't)	Pillsbury P, Little	1996	No	33	1,598	.									1,598	2.0
			Lbs	11.3	1,200	.									1,200	0.9
		1997	No	54	1,373	33									1,406	3.7
			Lbs	15.3	1,031	2.7									1,034	1.5
		1998	No	101	4,184	91									4,276	2.3
			Lbs	35.0	1,727	7.7									1,735	2.0
	Salmon P	1995	No	66	2,039			199							2,238	2.9
			Lbs	23.4	35			3.7							39	37.5
	Secret P	1995	No	40	136			1		22					159	20.1
			Lbs	7.4	2.5			0.1		0.4					3	71.2
	Turner P (Big)	1996	No	144	4,978										4,978	2.8
			Lbs	46.5	113.8										114	29.0
		1997	No	240	.										.	.
			Lbs	58.8	43.4										43	57.5
		1998	No	330	.										.	.
			Lbs	150	41.1										41	78.5
High	B Pond	1998	No	277	333	51								22	406	40.6
			Lbs	101	.	.								.	.	.
	Crosby P	1996	No	142	643	305			4						952	13.0
			Lbs	61.1	188	12			0.1						200	23.4
		1997	No	156	1,152	239			8						1,396	10.1
			Lbs	42.6	158	10.3			0.1						168	20.2

Table 16. Relative abundance of brook trout and competing fish species captured during post-season in study waters, 1994-98 (con't).

Competi-			Fish		Competing species											Percent brook

tion	Water	Year	caught	BKT	SUC	MIN	BUL	SLT	SCL	BKF	CSK	LWF	LKT	EEL	All	trout
High (con't)	Crosby P	1998	No	156	842	219			7						1,068	12.7
			Lbs	62.2	81	8			0.1						151	29.2
	Kamankeag	1996	No	109	359	251			10						620	15.0
			Lbs	21.6	65	8			0.2						73	22.8
		1997	No	57	405	401			2						808	6.6
			Lbs	6.0	106	11.6			<0.01						118	4.9
	Moxie P, Little	1994	No	381	11,003	3,558									14,561	2.5
			Lbs	59	2,082	89									2,171	2.6
		1995	No	253	7,100	1,528									8,628	2.8
			Lbs	109	1,394	57									1,451	7.0
Oligo-trophic	Clear L	1996	No	128	.	.		.			48	189	3		.	.
			Lbs	86	.	.		.			25	173	19		.	.
		1997	No	174	42	0	0	0			136	62	18		258	40.3
			Lbs	117.7	78.8	0	0	0			66.5	105.2	70.4		321	26.9
		1998	No	153	64	2	5	0			153	175	15		414	27.0
			Lb	143.9	100.5	0.3	1.5	0			58.6	243.6	56.4		461	23.8

Table 16. Relative abundance of brook trout and competing fish species captured during post-season in study waters, 1994-98 (con't).

Percent Competition	Water	Year	Fish caught	BKT	Competing species											brook trout
					SUC	MIN	BUL	SLT	SCL	BKF	CSK	LWF	LKT	EEL	All	

Low	**All**	**All**	**No**	**279**	**25**	**270**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**298**	**48.4**
	(n=7)		**Lbs**	**1,698**	**8**	**8**	**0**	**0**	**<1**	**0**	**0**	**0**	**0**	**0**	**16**	**99.1**
Mod	**All**	**All**	**No**	**264**	**695**	**1,712**	**0**	**50**	**0**	**2**	**0**	**0**	**0**	**0**	**2,459**	**9.7**
(n=11)		**Lbs**	**72**	**376**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**410**	**14.9**	
High	**All**[30]	**All**	**No**	**191**	**2,730**	**819**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**3,555**	**5.1**
(n=8)		**Lbs**	**58**	**582**	**25**	**0**	**0**	**0.1**	**0**	**0**	**0**	**0**	**0**	**665**	**8.0**	
All	**All**	**All**[31]	**No**	**235**	**1,109**	**832**	**0**	**22**	**.**	**1**	**0**	**0**	**0**	**0**	**1,966**	**10.7**
	(n=25)		**Lbs**	**63**	**300**	**26**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**326**	**16.2**
Oligo-	**Mean**		**No**	**152**	**53**	**0**	**2**	**0**	**0**	**0**	**112**	**142**	**12**	**0**	**336**	**31.1**
trophic	**(n=3)**		**Lbs**	**116**	**90**	**0.1**	**0.5**	**0**	**0**	**0**	**50**	**174**	**49**	**0**	**391**	**22.9**

Table 17. Post-season estimates of brook trout abundance and weight (lb) by competition type and ages for study waters, 1994-98.

Competition	No. of lakes & (no. samp-	Brook trout abundance	Ages						
			I+	II+	III+	IV+	V+	VI+	All

[30] Little Moxie Pond data for 1996 and 1997 are omitted from mean because competing species were removed.

[31] Little Moxie Pond catches post-1994 are not included in summary because competing species were removed. Clear Lake and Little Pillsbury Pond warmwater species data are not included because information is partially or entirely missing.

value	les)	variable							
Low	5	No/a	7.1±1.2	14.8±1.6	5.8±1.3	0.4±0.1	0	0	27.8±2.8
	(10)	Lb/a	1.2±0.4	4.8±1.0	3.3±0.8	0.3±0.1	0	0	9.6±2.0
		N	2,108	4,210	1,773	80	0	0	8,098
Moderate	6	No/a	5.0±1.3	3.9±1.6	1.1±0.4	0.1±0.1	0	0	10.4±3.1
	(12)	Lb/a	0.8±0.2	1.1±0.3	0.630.23	0.1±0.1	0	0	2.9±0.6
		N	4,156	3,099	831	87	0	0	8,445
High	4	No/a	1.6±0.8	2.1±0.5	1.0±0.3	0.2±0.1	0.1±0.1	0.02±0.02	5.1±1.5
	(10)	Lb/a	0.1±0.02	0.4±0.1	0.4±0.1	0.1±0.1	0.2±0.1	0.04±0.04	1.2±0.3
		N	1,333	2,693	1,138	188	48	8	5,414
Oligotrophic	1	No/a	0	0.2±0.1	0.1±0.02	0.03±0.01	0.01±0.01	0	0.3±0.1
	(3)	Lb/a	0	0.070.0 1	0.2±0.1	0.03±0.0 2	0.01±0.01	0	0.4±0.1
		N	2	283	253	61	14		619

Table 18. Duncan's multiple range test for differences in sizes of brook trout sampled from wild brook trout study lakes 1994-98, separated by ages and by competing species. Sample size in parentheses. Means joined by vertical lines are not significantly different (P=0.05).

Age I+		Age II+		Age III+			
Competition	No. of lakes	Mean length	Mean weight	Mean length	Mean weight	Mean length	Mean weight
Low	3	192 (612)	70 (588)	252 (632)	172 (628)	322 (235)	369 (233)
Moderate	4	190 (208)	80 (191)	234 (86)	155 (82)	341 (49)	511 (49)
High	3	150 (183)	35 (150)	222 (470)	114 (455)	273 (266)	216 (261)

Table 19. Chi-square test for significant differences between the proportions of older-age brook trout sampled from study lakes and separated by the degree of interspecific competition. Percentages in parentheses.

	Interspecific competition		
Age group	Low-Moderate	High-Severe	All waters
I+ - II+	1,393 (83)	712 (67)	2,105 (77)
III+ and older	285 (17)	353 (33)	638 (23)
Totals	1,678	1,065	2,743

X^2=95.331 P=0.001[32]

Table 20. Effects of removal of competing fish species from Little Moxie Pond, 1994-98.

Year(s)	Pounds brook trout captured	Pounds competing species removed	Percent brook trout	Competition category	Percent of trout age III+ and older	Mean length and (number) of brook trout captured
1994	59	2,171	3	High	10.7	187±2 (491)
1995	109	1,451	7		27.6	244±8 (110)
1994-95	**168**	**3,622**	**4**		**17.9**	**197±3 (601)**
1996	209	111	65	Moderate	19.0	258±6 (166)
1997	113	127	47		7.1	230±3 (403)
1996-97	**322**	**238**	**58**		**14.2**	**238±4 (569)**
1998	1,370	27	98	Low	14.0	261±5 (100)

[32] P<0.05 indicates a significant difference.

Appendix 1. Historical estimates of angler use and harvest rates of wild brook trout from Maine lakes.

Water	Competing species[33]	Year	No. angler trips per acre	Brook trout harvest: No/a	Brook trout harvest: Lb/a	Post-season pop. est. No/a
Desolation Pond	MIN	1984	1.6	0.9	0.4	
Jo-Mary P	WHS, MIN	1961	6.2	7.0	3.6	8.1
		1966	20.1	12.4	15.4	7.3
		1968	23.8	13.1	9.6	6.1
		Mean	**16.7**	**10.8**	**9.6**	**6.9**
Johnston P	MIN	1962	17.9	71.9	16.6	10.6
		1963	8.9	26.9	6.0	42.1
		1964	9.9	46.9	12.2	46.5
		1965	11.1	45.1	13.9	29.5
		Mean	**11.9**	**47.7**	**12.1**	**34.3**
All lakes		**Mean**	**12.4**	**29.4**	**9.7**	**21.5**

[33] MIN = minnow species; SLT = rainbow smelt; WHS = white sucker

Appendix 2. Summer water quality values of wild brook trout study lakes and statewide means of all Maine wild brook trout lakes less than 200 acres, 1993-96.

Water	Date	Depth (ft)	Temp. (°F)	pH	Oxygen (ppm)	Total Alkalinity
B Pond	22JUN77	0	58	5.7	9	1
		10	57			
		20	57			
		30	55			
		35	54	4.6	7	
Beaver P	28JUL94	0	73	6.2	7.8	
		5	73			
		10	64		3.4	
		16	57		3.0	
		20	55	6.0	2.5	
Brown P	25JUL95	0	78	6.8	9.0	7
		5	73			
		7	72	6.8	9.0	7
Clear L	20JUL94	0	73	7.2	8.6	14
		10	72		8.6	
		20	71		8.6	
		30	55		10.8	
		40	47		9.3	
		50	44		5.5	
		60	43		3.5	
Coffeelos P	17JUL96	0	70	6.8	8.0	10
		10	70			
		19	70	6.8	7.0	8
Crosby P	11AUG92	0	69	6.8	8.0	7
		5	69		7.9	
		10	67		7.5	
		15	65		6.4	
		20	59	6.1	1.3	
		25	54		1.5	
Daicey P	23AUG90	0	72	6.6	9.0	5.0

		10	69			
		20	68	6.6	7.0	5.0
Johnston P	23JUN94	0	66	6.7	9.1	2
		10	66		9.1	
		20	54	6.7	12.0	1.5
		30	45		12.6	
		40	44		11.5	
		50	43	6.0	10.5	1.0
Kamankeag P	06AUG96	0	72	6.4	8.6	5
		5	67		10.2	
		10	60		9.7	
		15	55	6.2	8.4	4
		20	51		4.8	
		24	50		2.5	

Appendix 2 (con't). Summer water quality values of wild brook trout study lakes and statewide means of all Maine wild brook trout lakes less than 200 acres, 1993-96.

Water	Date	Depth (ft)	Temp. (°F)	pH	Oxygen (ppm)	Total Alkalinity
Moxie P	26JUL94	0	77	6.4	8.0	2
(Little)		8	73	6.2	9.0	2
Pillsbury P	06JUL92	0	65	7.4	9.2	24
(Little)		4	64		9.3	
		8	64		9.6	
Salmon P	25JUL95	0	75	6.6	9.0	6
		5	72			
		9	61	6.0	5.0	7
		10	58			
		15	50			
		16	48	5.8	1.0	8
Secret P	25JUL95	0	78	6.4	9.0	
		5	73			
		10	58			
		13	51	5.8	7.0	7
		15	47			
		20	43			
		25	42			
		30	40	5.8	1.0	20
Thissell P	8AUG58	0	66	7.1	8.6	
		10	66			
		20	66			
		25	66			
		30	57		7.4	
		35	54	6.2	4.4	
		40	57	6.1	1.8	
Turner P	13AUG96	0	72	6.7	7.7	8
(Big)		3.3	70		7.9	
		6.6	70		7.6	
		9.8	66		7.0	
		13.1	59	6.2	5.0	7
		16.4	54		3.4	
		19.7	48		2.4	
		23.0	46		1.9	

		26.2	45		1.5	
		29.5	44		1.1	
		32.8	44	6.0	0.7	8
All (sample size in parentheses)	**1977-96**	**0-10**	**69 (38)**	**6.6 (16)**	**8.3 (28)**	**7.1 (15)**
		11-20	**56 (19)**	**6.2 (9)**	**5.3 (15)**	**5.4 (6)**
		>20	**47 (17)**	**5.8 (5)**	**5.6 (16)**	**7.5 (4)**

Appendix 2 (con't). Summer water quality values of wild brook trout study lakes and statewide means of all Maine wild brook trout lakes less than 200 acres, 1993-96.

Water	Date	Depth (ft)	Temp. (°F)	pH	Oxygen (ppm)	Total Alkalinity
Statewide average	**1984-93**	**0-10**	**70 (224)**	**6.7 (88)**	**9.2 (138)**	**10.3 (71)**
		10-20	**57 (105)**	**6.2 (21)**	**6.4 (58)**	**10.7 (13)**
		>20	**45 (137)**	**6.2 (16)**	**4.3 (98)**	**10.2 (9)**

Appendix 3. Consensus ratings of fish species as brook trout competitors.

Species	code	Rating raters	Mean	Std. dev.	Category
Stickleback species	SKB	16	1.3	1.3	Low
Slimy sculpin	SCL	14	1.4	0.7	
Finsescale dace	FSD	14	1.9	1.6	
Northern redbelly dace	NRD	16	2.1	1.4	
Blacknose shiner	BNS	12	2.5	1.4	
Pearl dace	PRD	15	2.5	1.6	
Fathead minnow	FHM	14	2.7	1.8	Moderate
Banded killifish	BKF	16	3.1	2.3	
Lake whitefish	LWF	16	4.1	2.7	
Burbot	CSK	1	4.2		
Lake trout	LKT	16	4.3	1.9	
Golden shiner	GLS	16	4.7	1.4	
Lake chub	LCB	16	4.9	2.4	
American eel	EEL	16	5.6	2.0	High
Rainbow smelt	SLT	16	5.9	2.3	
Longnose sucker	LNS	14	6.4	1.9	
Creek chub	CCB	16	6.7	2.5	
White sucker	WHS	16	9.1	1.4	Severe

Species	Species code	No. of raters	Mean	Std. dev.
Blacknose dace	BND	16	2.1	1.7

Appendix 4. Values assigned to brook trout regulations to define regulation severity.

Assigned limit	Regulatory limit (in)	Creel restriction	Length value	Gear category
5	6	None	0	Low
2	6	None	2	Low
1	6	None	3	Moderate
5	8	None	1	Low
5	10	None	2	Low
5	12	None	3	Moderate
5	6	NLFAB	0.5	Low
5	6	ALO	1	Low
5	6	FFO	2	Low
2	8	None	3	Moderate
2	10	None	4	Moderate
2	10; 1>12	None	4.5	Moderate
2	12	None	5	High
2	12; 1>14	None	5.5	High
1	8	None	4	Moderate
1	10	None	5	High
1	12	None	6	High
2	6	NLFAB	2.5	Moderate
2	6	ALO	3	Moderate
2	6	FFO	4	Moderate
1	6	NLFAB	3.5	Moderate
1	6	ALO	4	Moderate
1	6	FFO	5	High
5	8	NLFAB	1.5	Low
5	8	ALO	2	Low
5	8	FFO	3	Moderate
5	10	NLFAB	2.5	Moderate
5	10	ALO	3	Moderate
5	10	FFO	4	Moderate
5	12	NLFAB	3.5	Moderate
5	12	ALO	4	Moderate
5	12	FFO	5	High
2	8	NLFAB	3.5	Moderate
2	10	NLFAB	4.5	Moderate
2	10; 1>12	NLFAB	5	High
2	12	NLFAB	5.5	High
2	12; 1>14	NLFAB	6.0	High
2	8	ALO	4	Moderate
2	10	ALO	5	High
2	10;1>12	ALO	5.5	High
2	12	ALO	6	High
2	12; 1>14	ALO	6.5	High

2	8	FFO	5	High
2	10	FFO	6	High
2	10; 1>12	FFO	6.5	High
2	12	FFO	7	High
2	12; 1>14	FFO	7.5	Severe
1	8	NLFAB	4.5	Moderate
1	10	NLFAB	5.5	High
1	12	NLFAB	6.5	High
1	8	ALO	5	High
1	10	ALO	6	High
1	12	ALO	7	High
1	8	FFO	6	High
1	10	FFO	7	High
1	12	FFO	8	Severe
1	18	ALO	9.5	Severe
1	18	FFO	9.75	Severe
0			10	C&R